DEVOTED TO
TEXTILE CHEMISTRY
AND
WET-PROCESSING
BLEACHING
DYEING
PRINTING
FINISHING

MARCH 21, 1949
VOLUME 38, No. 6

AMERICAN DYESTUFF REPORTER

ASHEVILLE PUBLIC LIBRARY

PONTAMINE
REG. U. S. PAT. OFF.
Diazo Orange N Conc.

Brilliant reddish-orange . . . can be discharged to a pure white on cotton and viscose-process rayon. Good resistance to crocking, hot moist pressing, steaming and cold water. Readily soluble, penetrates and levels well. Especially recommended as a base in browns for discharge patterns on dress goods and for shading reds and scarlets. Our Technical Staff will gladly give you additional information.
E. I. du Pont de Nemours & Co. (Inc.), Dyestuffs Division, Wilmington 98, Delaware.

Du Pont Dyestuffs

DUPONT
REG. U. S. PAT. OFF.

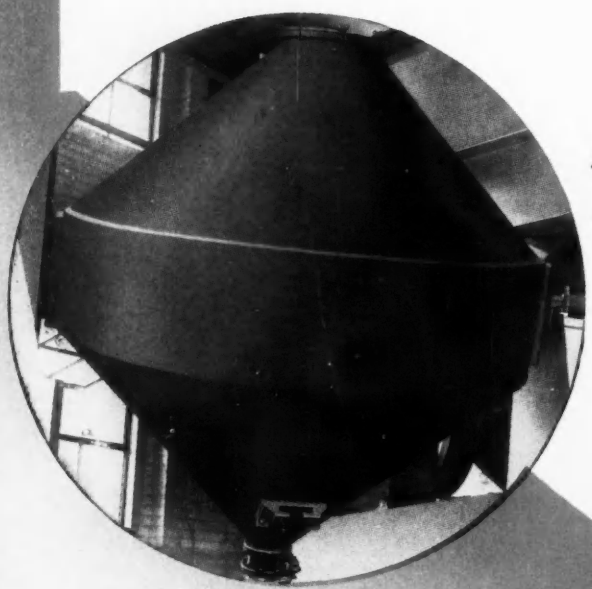
BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

OFFICIAL PUBLICATION
of the
PROCEEDINGS
AMERICAN ASSOCIATION
OF TEXTILE CHEMISTS
AND COLORISTS

uniformity . . .

. . . . with Giant Blenders

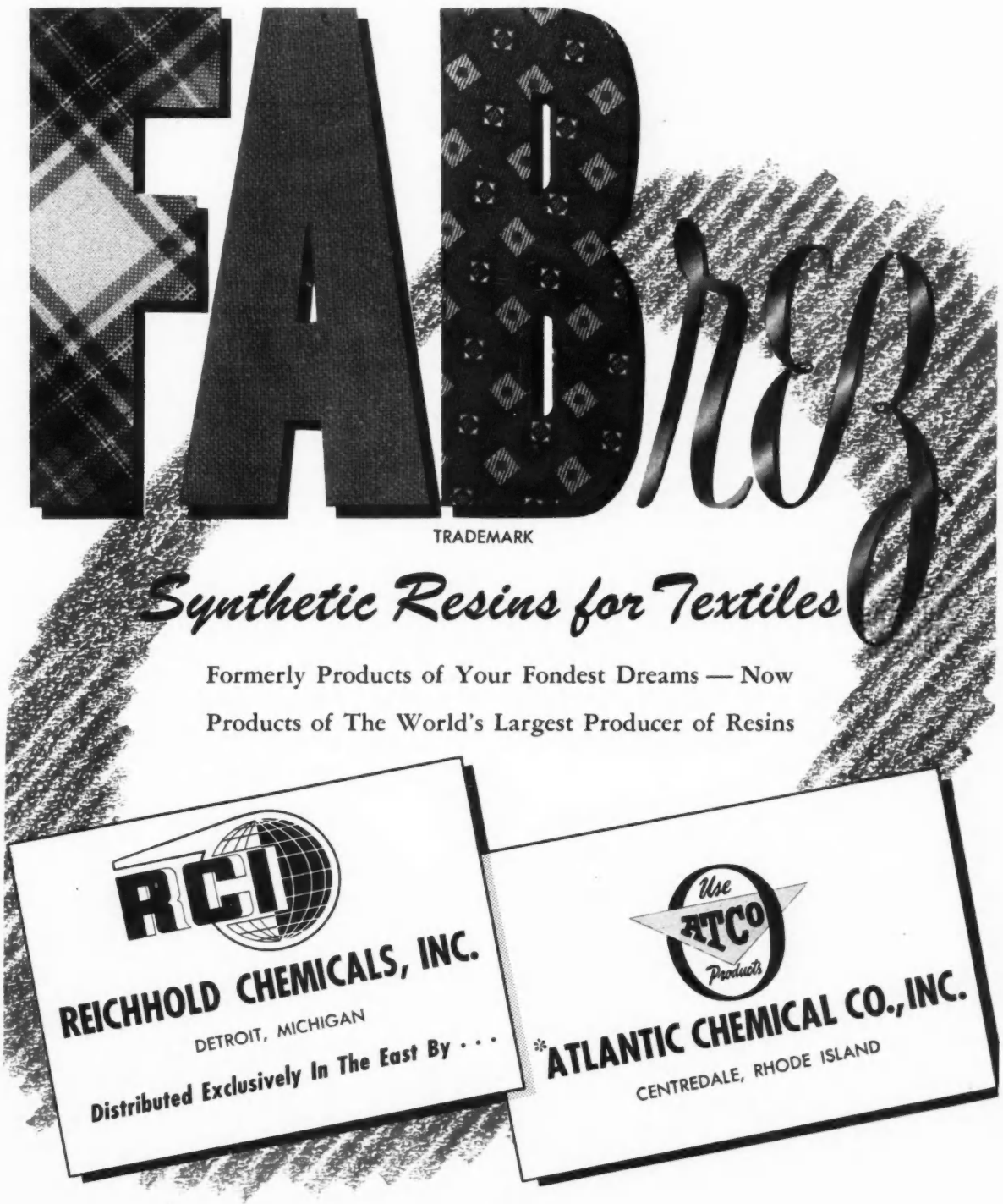
These powerful "big boys" were built to comply with our specifications for rigid control, to give you a superior product. They make possible more uniformity in standardization of the dye as manufactured.



As a result, we can standardize each shipment of ALTCO dyestuffs and you can depend upon *uniform results, thanks to our more modern* methods of PRECISION Dye-Making.

ALTHOUSE
Chemical Company, Inc.
READING · PA.

pace-setter in precision dye-making

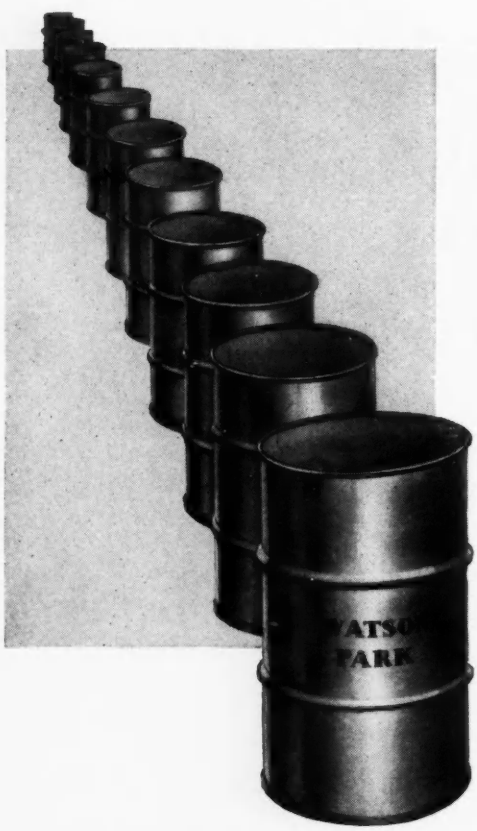


*Complete Fabrez Technical Information On Request

Liquid

HYDRALDEHYDE

The Name to Remember When Buying Stripping Agents



Outselling all others since its origin twenty years ago — it is *today* the woolen industry's *safe* stripper. Our constant efforts to eliminate free zinc in *liquid* HYDRALDEHYDE through modern manufacturing methods assure stronger fibres in reworked wool and piece goods.

Test *liquid* HYDRALDEHYDE against any other stripping agent offered — either powder or liquid — for a true comparison of the fibre's breaking strength.

WATSON-PARK COMPANY

261 FRANKLIN STREET BOSTON, MASS.

FACTORY · LOWELL JUNCTION · MASS.

American Dyestuff Reporter, Vol. 38, No. 6. March 21, 1949. Published every other Monday. Copyright 1949, by Howes Publishing Co., Inc. One Madison Ave., New York 10, N. Y. Domestic subscription, $5.00; Canadian, $6.00. Foreign, $10.00. Entered as second-class matter, Nov. 6, 1919, at the New York, N. Y., Post Office, under the act of March 3, 1879.

when you need STIFFNESS

There are three Onyx water dispersions of synthetic resins for use on finishing operations involving sizing, stiffening and impregnating.

All three are based on linear addition polymerization resins which do not require curing or heating. Goods are treated in the usual manner with no changes in equipment.

Xyno Resins contain no solvents. They are stable at all dilutions. They will not putrefy . . . and impose no hazards of toxicity or inflammability. They are compatible with alkalies, dilute acids and hard water.

XYNO RESIN AA40 is a water-thin dispersion of moderate particle size. It is a general purpose finish for cotton, rayon, acetate and nylon constructions of particular value on ribbons and piece goods. Many interesting effects in crispness and springiness may be obtained by combining Xyno Resin AA40 with Onyx NCF Paste or Liquid Resin SS.

XYNO RESIN 569 is a water-thin dispersion of fine particle size. It offers the best wash resistance of all Xyno Resin dispersions. It is used to impart a wide range of sizing and stiffening effects on all types of textiles. It improves wear resistance, decreases slippage, and has a dulling effect on acetate.

XYNO RESIN 362 is a viscous water dispersion of relatively large particle size. It is used on cotton, rayon, acetate and nylon constructions to impart a wide range of stiffness from extreme to moderate. It is unusually successful on ninons, marquisettes and organdies. Further variety in effects may be obtained by using Xyno Resin 362 in combination with Onyx softeners like Mapromol HSY.

Write for Onyx Technical Bulletin TX-2 which covers the theory and application of all Onyx Resins, Xyno Resin Dispersions and Solutions.

onyx

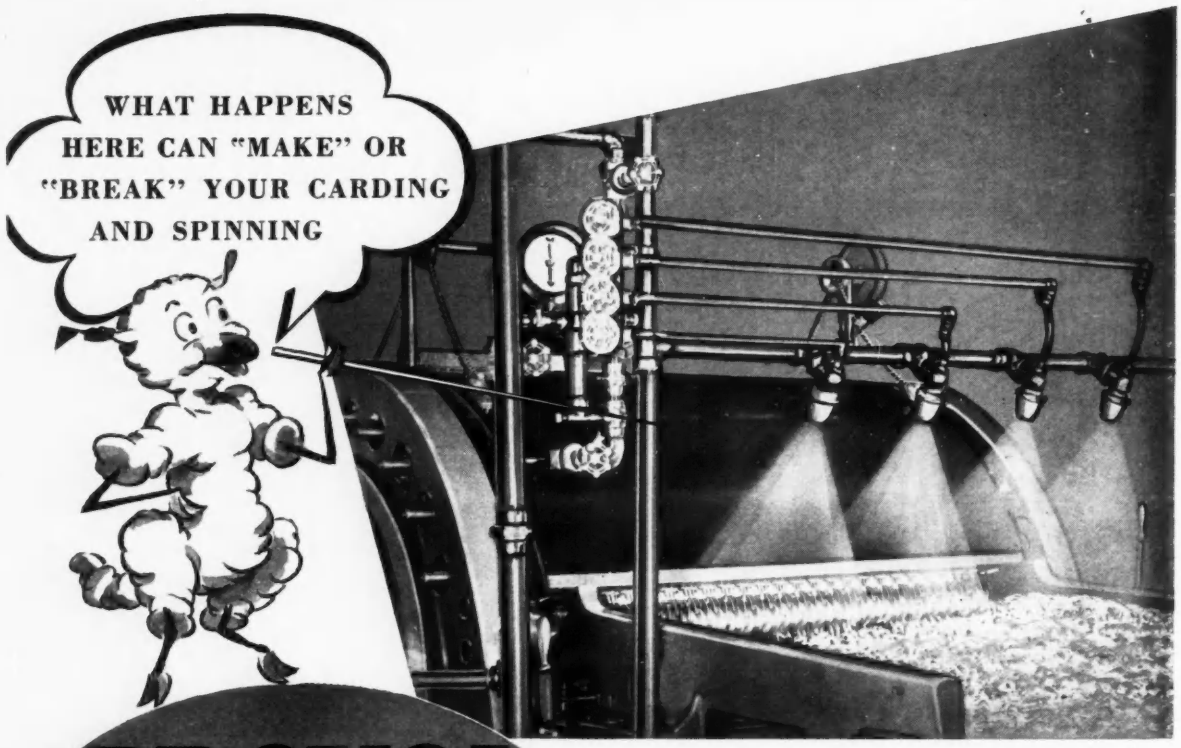
CHEMICALS FOR DYEING • FINISHING • PRINTING

ONYX OIL & CHEMICAL COMPANY

JERSEY CITY 2, N. J.

CHICAGO • PROVIDENCE • CHARLOTTE • ATLANTA

In Canada: Onyx Oil & Chemical Co., Ltd., Montreal, Toronto, St. Johns, Que. *For Export: Onyx International, Jersey City 2, N. J.*



PROXOL

the Multi-Quality WOOL OIL

PROCTER & GAMBLE · MADE IN U.S.A.

the right answer

FOR YOUR WOOL CARDING AND SPINNING PROBLEMS

It's no trick to apply wool oil. And most good wool oils will give reasonably satisfactory results in carding and spinning—from a lubrication standpoint. But that's only part of the story! When the lubricating job is done, *will the oil scour out easily?*

If it falls down here, you know what can happen. Some oils are difficult to scour out. Others oxidize on the fibers, yarns and fabrics during storage, causing fabric discoloration, poor scouring, uneven dyeing and objectionable odors.

PROXOL lubricates efficiently—scours easily

Wool oiled with Proxol is properly oiled for smooth efficient carding and spinning. Fiber breakage is minimized. Furthermore, Proxol scours out easily and thoroughly after its lubricating job is done, with 40% to 75% savings in the soap normally used.

Your worries about discoloration and undesirable odors in stored fibers or fabrics are over when you use Proxol. Try Proxol. You'll find it a paying investment in terms of trouble-free carding, spinning and scouring.

Procter & Gamble

what is Proxol?

Proxol is a clear wool oil of exceptionally uniform quality. Highly resistant to oxidation. Pour point less than 20°F. Self-emulsifiable in soft or hard water at all temperatures. Emulsions are extremely stable — stay the same after standing as when freshly prepared. Small emulsion particle size assures fast, even penetration. Antistatic—consistently produces less waste than is normally expected. Proxol's efficient lubrication and proper drag produce stronger, more uniform yarns, better fabrics . . . reduce stripping. Non-corrosive . . . assures longer life for card clothing. Proxol means fewer ends down...more yarn per spinning operator hour.

PROXOL

is made by the makers of Olate, the universal low-titre textile soap

FASTOGENE*
A dyehouse utility product of merit for

— *dyeing*
— *printing*
— *finishing*

fastogene

A simple after-treatment with *Fastogene* imparts amazing water fastness to cottons, rayons, multifibres... prevents wet migration and drying streaks... halts bleeding of colored grounds into white discharge. *Fastogene* permits wet-piling and cross dyeing and imparts a soft hand to finished fabrics.

Another of the American Aniline range of superior textile auxiliaries.
For detailed information regarding your own particular requirements consult our nearest branch.
A.A.P. technicians are always happy to be of service.

AMERICAN ANILINE PRODUCTS, INC.

50 Union Square, New York, N. Y. • **Plant: Lock Haven, Pa.** • **Branches:** Boston, Mass. Providence, R. I. • Philadelphia, Pa. • Charlotte, N. C. • Chicago, Ill. • Los Angeles, Cal. Chattanooga, Tenn. • **Dominion Anilines & Chemicals Ltd.** • Toronto, Canada • Montreal, Canada

*Reg. U. S. Pat. Off.

Textile Detergent Operations

OPERATION AND FIBER	PURPOSE OF OPERATION	DETERGENT PROPERTIES REQUIRED	DETERGENT RECOMMENDED
KIERBOILING Cottons	To remove natural waxes, motes, pectins and soil; to improve absorbency	Rapid penetration and/or soil removing and suspending action	Certified Flint *Regal *Energetic
BOIL-OFF 1. Cotton	To remove natural waxes, motes, pectins and soil; to improve absorbency	Rapid penetration and/or soil removing and suspending action	Certified Flint *Regal *Energetic
2. Synthetics including hosiery	To remove spinning oils, sizing compounds and soil	Good detergent action; in some cases leveling properties	Certified Flint Giant *Energetic *Triumph
CONTINUOUS BLEACH Cottons	To remove natural waxes, motes, pectins and soil; to improve absorbency	Rapid penetration	*Regal
DESIZING Cottons	To remove size	Rapid penetration and wetting action	*Regal
SCOURING 1. Raw wool	To remove grease and dirt	Good detergent properties. Easy solubility and rinsability	Re-Nu Texscour Certified *Triumph *Regal
2. Wool piece goods and yarn	To remove spinning oils and soil	Oil emulsification	Texscour Certified *Regal
DYEING 1. Cottons	To improve dye penetration and leveling action	Stability to acids often necessary	*Regal *Energetic
2. Wool	To perform leveling action	Dye suspending action; stable to acid	*Energetic
SOAPING 1. Cottons dyed	To remove excess dye; bringing up color	Maximum detergent action	Flint *Triumph *Energetic
2. Prints	To remove gums, starches, etc.	Maximum detergent action	Flint *Triumph *Energetic
FULLING Wool	To aid in fulling operation and scouring	Good lubricant properties	Flint Certified
FINISHING 1. Cottons	To apply a soft hand to goods	Low titer; freedom from rancidity	Certified Texcour
2. Synthetics	To provide scroop	High titer; freedom from rancidity	Flint

***Synthetic detergent**

Additional copies of this chart, and full information on any product may be secured from ARMOUR AND COMPANY, Industrial Soap Division, 1355 W. 31st Street, Chicago 9, Illinois.

GIVE YOUR FABRICS

A HAND

A WIDELY ACCLAIMED

PERFORMER AMONG

CATIONIC FINISHING AGENTS

Where a soft, smooth "hand" is required, your selection of a cationic finishing agent is most important. DRUCOMINE A economically imparts the desired finish effect to fine fabrics, while assuring maximum preservation of light-fastness and safety to sensitive shades.

DRUCOMINE A can be employed successfully alone or in conjunction with synthetic resins. Samples and literature upon request.

E. F. DREW & CO., INC.

15 EAST 26th STREET · NEW YORK 10, N. Y.

FACTORY & LABORATORIES: BOONTON, NEW JERSEY

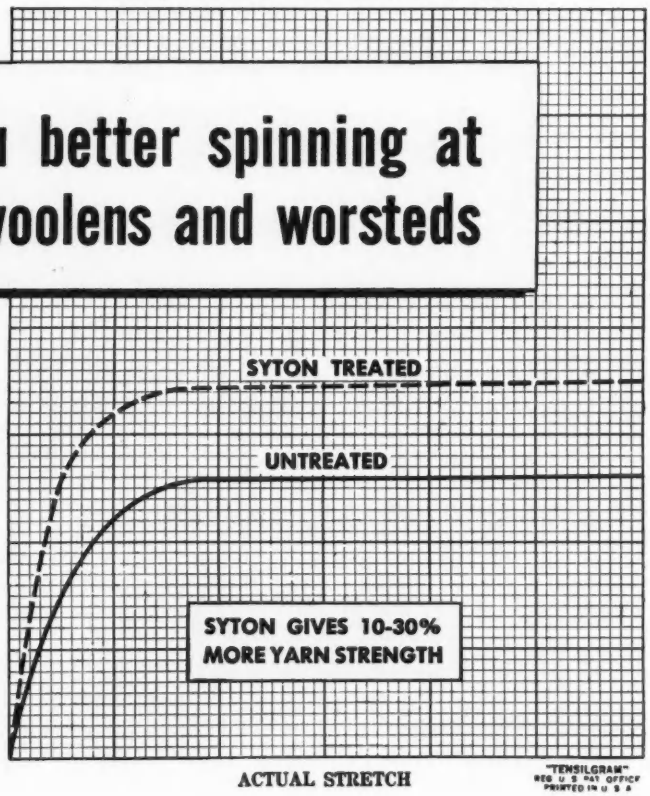
BRANCH OFFICES: CHICAGO • BOSTON • PHILADELPHIA • GREENVILLE, S. C. • MONTREAL, CANADA • RIO DE JANEIRO, BRAZIL • BUENOS AIRES, ARGENTINA

FOR YOUR INFORMATION

Henry L. Scott Co. Providence, R. I., U. S. A.

SYTON gives you better spinning at LOWER COST with woolens and worsteds

Laboratory tests and actual field experience show Syton gives 10-30% more yarn strength in woolen and worsted spinning



This added yarn strength means:

FASTER PRODUCTION: Because of increased yarn strength, the amount of twist can be reduced and production speeded.

LOFTIER YARNS: Less twist means loftier yarns, with tensile strength equal to or better than the strength of untreated yarns of higher twist.

HIGHER COUNTS: Closer to limit spin—for most grades of stock can be attained with Syton-treated yarns.

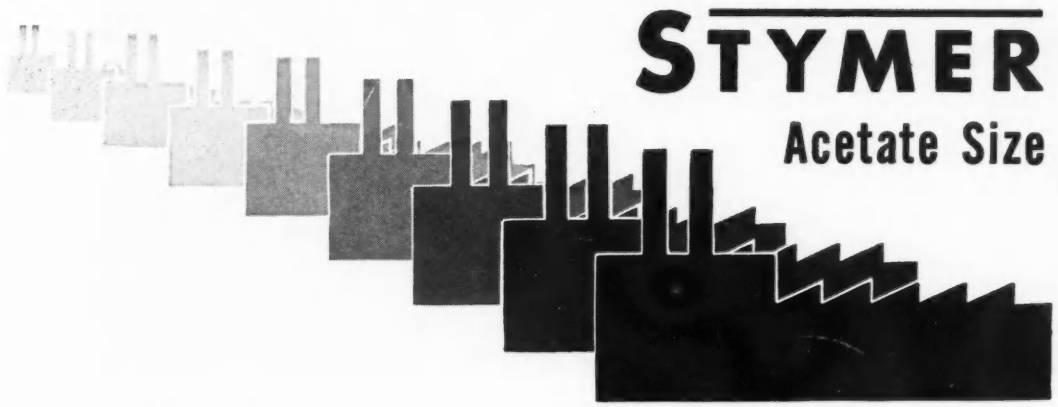
FEWER ENDS DOWN: Reductions vary from 25% to 50% depending on the grade of wool.

BETTER SPINNING EFFICIENCY: Syton produces more uniform yarn with less beard and thin spots, reduced fly waste, and better drafting.

WHAT SYTON IS:

Syton is a colloidal dispersion in water of submicroscopic silica particles which are deposited on the fibers, increasing fiber friction. The improved fiber "drag" increases yarn strength, results in better, more uniform draft control.

Already standard in more and more mills



STYMER
Acetate Size

Even though our production was limited in 1948, more than half a billion yards* of acetate fabric have been woven from Stymer-sized warps! Now, more and more mills are adopting Stymer every week. Mill owners are enthusiastic because this new synthetic sizing agent gives warp superior protection over a wide range of humidities and temperatures . . . makes weaving easier on the loom.

Here's how Stymer delivers:

1. Forms tough, smooth, flexible film
2. Reduces static electricity troubles
3. Increases operational efficiency
4. Easy to apply
5. Produces more uniform film on yarn
6. Easy to scour from the woven fabric in warm water containing a mild detergent.

Remember:

IN SLASHING, Stymer does not stick to uncovered dry cans, stops static electricity troubles, separates easily at the lease rods, does not gel in the pipes or size box.

IN WEAVING, Stymer-sized warps exhibit little or no shedding, maintain yarn twist, have fewer end breaks.

Clip the coupon below for full information on this amazing new sizing agent for acetates, Stymer.

*Based on estimated average weight of goods sized with tonnage of Stymer sold

Syton, Stymer: Reg. U. S. Pat. Off.

MONSANTO
CHEMICALS AND PLASTICS

MONSANTO CHEMICAL COMPANY, TEXTILE CHEMICALS DIVISION
Desk ADT 17 140 Federal Street, Boston 10, Mass.

Please send me information on ☐ *Stymer,* ☐ *Syton.*

Name _____ Title _____

Firm _____

Address _____

City _____ Zone _____ State _____

SERVING INDUSTRY . . . WHICH SERVES MANKIND

IF YOU WANT

DURABLE *Softness*

Paramine TA is the modern cationic finish for acetate, viscose, cotton and mixed fibres. Mills using paramine TA for dress goods, glove fabrics, tricot and other types of knitted materials have found this finish offers added sales appeal.

Thorough penetration of Paramine TA assures a softness within the yarn itself that gives materials a full hand and desirable drape — its substantive action produces a durable, lasting finish — Application is simple.

Use Paramine TA

*Reg. U. S. Pat. Off.

WRITE FOR DETAILS OR DEMONSTRATION

Arkansas Co. INC.

Manufacturers of Industrial Chemicals for Over 40 Years

NEWARK, NEW JERSEY

vat fastness
ease of application

algosols

for cotton · rayon
mixed fibers
wool · printing

For detailed information regarding Algosols communicate with our home office or any of our branches.

GENERAL DYESTUFF CORPORATION
435 HUDSON STREET, NEW YORK 14, NEW YORK
BOSTON·PHILADELPHIA·CHARLOTTE·PROVIDENCE·CHICAGO·SAN FRANCISCO

There's a Time for Dullness

EVELYN DUNGAN

This month's Fancourt girl says, "I learned a long while ago that a girl's pretty safe in evaluating hosiery by dullness. For my part, hosiery must never, never have that 'spotlight shine'."

. . and with smart hosiery, the time for soft, sheer, eye-caressing dullness is always. Though it's no small matter to impart lasting dullness to many of today's new yarns, Fancourt Chemists, with their many years of experience in the Hosiery Field, have solved the problem. Whether your finishing problem is dulling, or a firm or soft hand . . . no matter what, a Fancourt field man will be glad to show you what the latest development of the Fancourt Laboratories can do to help you in improving your hosiery's appearance.

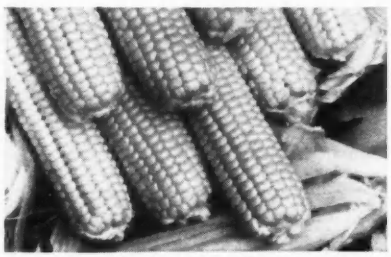
W. F. FANCOURT CO.

PHILADELPHIA, PA.

In the South, Howard A. Virkler, Greensboro, N. C.

Solving Finishing Problems Since 1904

TONS
TONS
TONS



Revolutionary process?

Yes! Bulk Corn Starch processed with the same precision control of color, texture and purity as National's specialty starches.

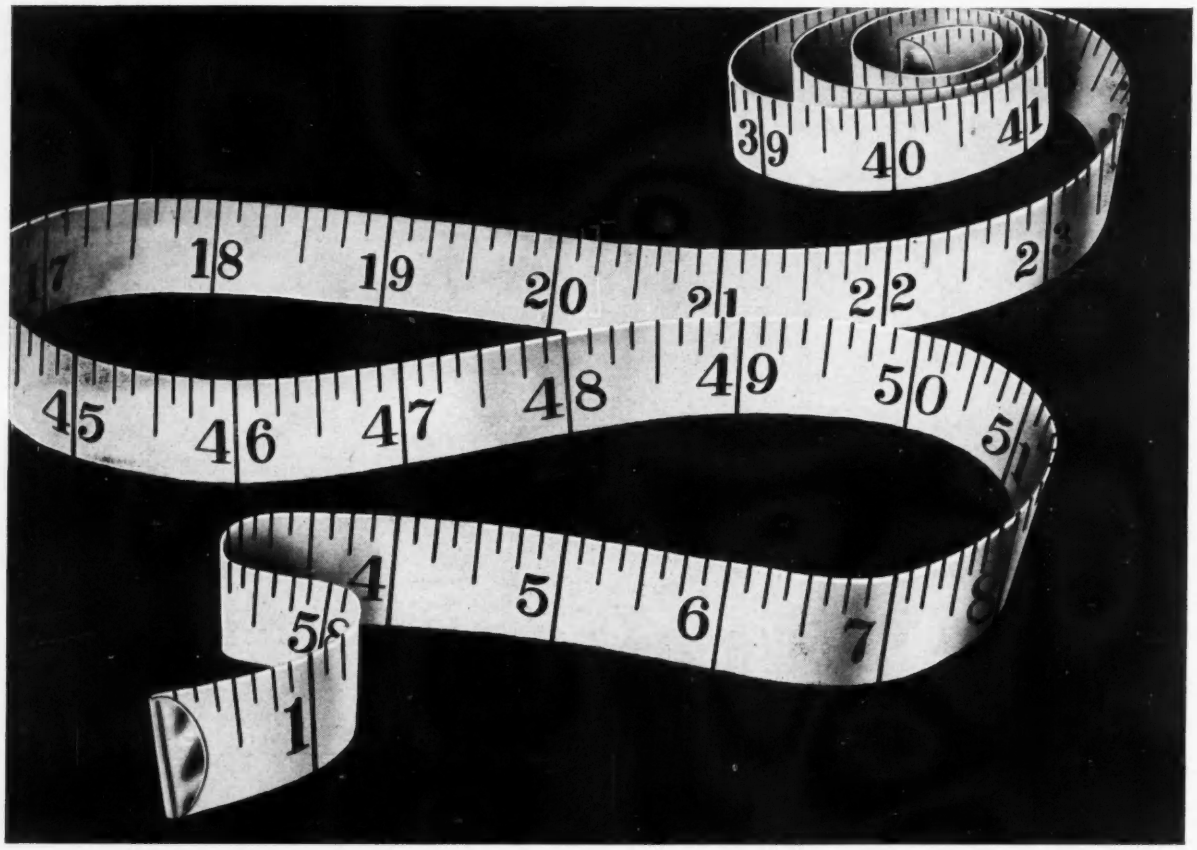
CLEAN? National is the first—*and only*—wet miller to use high-speed, enclosed MERCO centrifuging to separate starch from gluten in a continuous 100% mechanical operation. Separation is now effected mechanically in 3 to 5 minutes—instead of 10 to 12 hours on open starch tables which have been a long countenanced source of contamination. **QUANTITY?** National can now supply corn starch in any quantity—large or small! The entire processing, including the MERCO operation, requires only one-eighth the time needed by the starch table method. This speeds large quantity deliveries. In addition, National's MERCO system can be completely rebalanced in 3 hours. This permits us to make small or varied runs to meet the specific requirements of the textile industry for: ***Hoosier Pearl Corn Starch . . . Thin Boiling Corn Starch . . . Chlorinated Corn Starch . . . British gums*** and ***Dextrines.***

Technical service? Call on our laboratory anytime. Delivery? Prompt CL or LCL shipments from our plants or convenient warehouses.

BULK STARCH
BULK STARCH
BULK STARCH

Write for full details: 270 Madison Avenue, NEW YORK 16; BOSTON, PHILADELPHIA, ATLANTA, NEW ORLEANS, INDIANAPOLIS, CHICAGO, SAN FRANCISCO and other principal cities. In *Canada:* Meredith, Simmons & Co., Ltd., Toronto and Montreal. In *Holland:* Nationale Zetmeelindustrie, N. V. Veendam.

National
STARCH PRODUCTS



How would you measure an ENZYME?

Not with a tape measure . . . or a foot rule . . . or a yard stick.

Enzymes, as blended to make Diastafor brand de-sizing agent—Type L, are measured by their *special values* in your finishing and dyeing operations.

Measured in terms of workability under widely varying conditions, Diastafor Type L can be used in an unusually wide range of temperatures and pH, which brings great flexibility and ease to your de-sizing operations.

Measured in safety, Diastafor gives you a helping hand when you have to finish a "problem lot," or when variables in water or in sizing formulas create new and unexpected problems.

Measured in results, Diastafor can be depended on for a good "hand" and a fine finish whether you are working with cottons, rayons or mixed goods. Diastafor helps keep your dyeing even and unshaded, with no streaks or blemishes, no impairment of tensile strength.

Measured in economy, you get more enzymes per penny with Diastafor.

If you'd like to make your own measurement of the value of enzymes in your dyeing and finishing, try Diastafor, Type L, on one of your hardest lots. Its successful performance has made it the leader for over 40 years.

Our sales and technical staffs will be glad to give you further information about Diastafor. Write Standard Brands Incorporated. *Diastafor Department*, 595 Madison Avenue, New York 22, New York.

DIASTAFOR

A TRADE MARK OF STANDARD BRANDS INCORPORATED

How NOPCO* FUA

cuts your wool processing costs

3% **OF NOPCO FUA**

applied to stock is all you need—3 lbs. NOPCO FUA per 100 lbs. wool—as against

8% **OF CONVENTIONAL WOOL OILS**

This tremendous differential is only one of the reasons why this initially *higher priced* product is proving the *most economical* of all wool oils in actual performance. Other reasons are

100% **ELIMINATION OF SOAP**

NOPCO FUA *eliminates the need for all soaps and detergents* in fulling and scouring. It also stops static completely during carding. It does not rust or corrode. NOPCO FUA is anhydrous, all fatty, contains no mineral oil or hydrocarbons—is salt free and ash free.

What these percentages mean to YOU

They mean . . . increased production quality and volume, valuable savings of time and equipment, reduced cost of *all* operations. Try NOPCO FUA in your mill. Give your woolens the benefit of its many exclusive advantages, its unparalleled versatility.

NOPCO — EVOLVED THRU RESEARCH

SEND FOR NOPCO FUA TECHNICAL BULLETIN

Mail coupon today and get *all* the facts about NOPCO FUA's versatile aid to better wool processing.

NOPCO CHEMICAL COMPANY. Harrison, New Jersey

Formerly National Oil Products Company

BRANCHES: BOSTON • CHICAGO • CEDARTOWN, GA. • RICHMOND, CALIF

*Reg. U. S. Pat. Off.

NOPCO FUA

SELF-FULLING SELF-SCOURING WOOL OIL

MAIL TODAY

NOPCO CHEMICAL COMPANY
Harrison, New Jersey **(Dept. 23)**

Please send, without obligation, your NOPCO FUA Technical Bulletin.

FIRM NAME_____

STREET ADDRESS_____

CITY AND ZONE_____ STATE_____

SENDER'S NAME_____

ATLANTIC PETROLEUM CHEMICALS

ULTRAWET K

You'll compound a better product with Ultrawet

Ultrawet K in flake form contains 85% active-solids. When you're dry-mixing that's important, because you have greater flexibility in the choice of alkalis and other builders.

Ultrawet K has no odor, is light cream in color; it approaches the compounder's ideal. It's economical because it's highly concentrated. Our savings in processing, shipping and storage are reflected in its low price to you.

Ultrawet K is a development of Atlantic's more than 12 years' experience in the production of detergents and wetting agents.

APPLICATIONS	ULTRAWETS					
Form:	30E Liquid	30DS Liquid	35K Liquid	SK Bead	DS* Flake	K Flake
Minimum % Solids:	30	30	35			
Minimum % Active-Solids:	85	85	90	35	85	85
EMULSION BREAKING	✓					
LIGHT-DUTY HOUSEHOLD DETERGENTS				✓		
PENETRANT	✓	✓				
INDUSTRIAL DETERGENTS					✓	✓
HEAVY-DUTY HOUSEHOLD DETERGENTS						✓
EMULSIFIER					✓	✓
WETTING AGENT	✓	✓				
CHARGE STOCK FOR SPRAY AND DRUM DRYING			✓			
DRY MIXING WITH ALKALIS				✓	✓	✓
LIQUID HOUSEHOLD DETERGENTS		✓				
COUPLING AND SOLUBILIZING	✓					

*Formerly "E"

For samples, further information and quotations, communicate with

THE ATLANTIC REFINING COMPANY

Chemical Products Division

260 South Broad Street, Philadelphia 1, Pa.
Chamber of Commerce Building, Pittsburgh 19, Pa.
Hospital Trust Building, Providence 1, R. I.
1112 South Boulevard Street, Charlotte 3, N. C.
111 West Washington Street, Chicago 2, Ill.

L. H. BUTCHER COMPANY • San Francisco • Los Angeles
Seattle • Salt Lake City • Portland • Oakland

FROM COTTON PRINTS
TO RUN-PROOF NYLONS

Nothing takes the place of Glycerine

Glycerine is as useful today in new applications (run-proof nylons is just one example) as it always has been in the manufacture of cotton prints and other familiar products of the textile industry.

As a standard ingredient of printing pastes and spray dyeing solutions, glycerine acts as a suspending agent, a thickener, a dispersant, a penetrating agent, a humectant. As a chemical intermediate, it is essential in the preparation of those alkyd resins which are making possible today's crease-and-laundry-resistant fabrics, non-snag nylons.

And . . . glycerine is a softener, a plasticizer, a solvent — a chemical whose versatility . . . dependability . . . can be matched by no other product. That's why in the textile industry—or in almost any industry — *Nothing takes the place of glycerine!*

GLYCERINE PRODUCERS' ASSOCIATION
295 Madison Avenue
NEW YORK 17, NEW YORK

Technical GLYCERINE NEWS

COATED FABRICS SLATED FOR ARMY. Increasing need of plastic materials for ordnance was stressed by government technicians recently. Among major items cited for immediate use were coated fabrics, many of which are made with alkyd resins that represent an important end use of glycerine. (T-1)

★ ★ ★

TAKES BRITTLENESS OUT. Fabrics which are brittle and lack fats can now be treated by machine with glycerine. The treatment removes brittleness, increases wearability, and improves the feel of the goods. (T-2)

★ ★ ★

GLYCEROL VISCOSITIES TABLE AVAILABLE. Miner Laboratories, headquarters for the Glycerine Producers' Association program of glycerine research, has prepared a table of viscosities of glycerol in aqueous solution from 0 to 100 per cent, at from 0 to 100 degrees C. To obtain your copy, check T-3 on the coupon below. (T-3)

★ ★ ★

NEW HIGH TENACITY YARNS. Yarns described as having a tenacity of 4-6 grams per dernier, and an elongation of 18 to 20 per cent, can now be made from acrylonitrile polymers, it was revealed recently. In the manufacture of fibers from the already polymerized raw material, glycerine is reported to play an important role. (T-4)

★ ★ ★

BETTER LAUNDERING. To improve the appearance of laundered fabrics, a new glycerine-containing preparation has been developed which is said to be effective when added to the final rinse water or to the starch bath. (T-5)

★ ★ ★

PLANT SAFETY HINT. If your workers use safety goggles, glycerine is a must. It's one of the best anti-fogging agents—and it's a good lens cleaner, too.

GLYCERINE PRODUCERS' ASSOCIATION, DEPT. 13
295 MADISON AVENUE
NEW YORK 17, N. Y.

I should like to receive information on the source of the items appearing in **Technical Glycerine News.** I have checked below those items which interest me.

☐ T-1 ☐ T-2 ☐ T-3 ☐ T-4 ☐ T-5

NAME .....

COMPANY .....

ADDRESS .....

Announcing

A New Product for DYERS and PRINTERS

LOMAR PW the new dispersing agent developed by Jacques Wolf & Co., assures more efficient and economical processing.

• *In Dyeing*

Level shades and uniform absorption of dyestuffs by the fibres, depend largely upon an even dispersion of colors in the dyebath. The addition of a small amount of LOMAR PW in pasting up indanthrenes or acetates solves this problem.

• *In Printing*

When added to the printing paste, LOMAR gives finer particle suspension, improved flow and smoother consistency. By keeping the colors in suspension, LOMAR PW assures efficient, economical results.

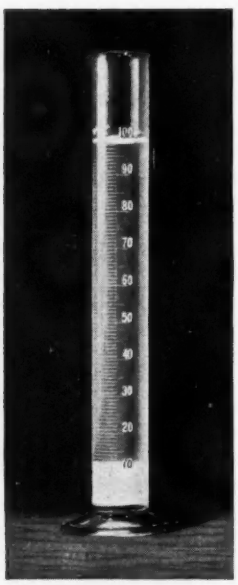
• *In Backfilling*

In backfilling, LOMAR PW is added to the heavy backfill mixture of clay and starches to give uniform suspension of the clay, good flowing properties and more uniform results on the fabric.

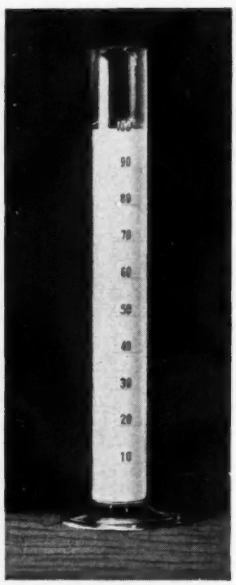
For complete information on LOMAR PW, send today for your copy of Bulletin No. 21.

TYPICAL OF THE DISPERSING ACTION OF LOMAR PW

The contents of these two graduates are identical, except for a small percentage of LOMAR PW. Note the continued even suspension and dispersion in the right hand graduate after standing ten times as long as the one at the left.



Blanc Fixe after 30 minutes — no dispersing agent



Blanc Fixe after 5 hours — plus LOMAR PW

Plants and Warehouses

Plants: Passaic, Carlstadt, N. J.; Los Angeles, California

Warehouses: Providence, R. I.; Philadelphia, Pa.; Utica, N. Y.; Chicago, Ill.; Greenville, S. C.; Chattanooga, Knoxville, Tenn.

WOLF BRAND PRODUCTS

JACQUES WOLF & CO. *Chemicals* PASSAIC, N. J.

The new home of REFINED PRODUCTS CORPORATION, Lyndhurst, New Jersey
Manufacturers of chemical specialties for the textile and other industries

Where more than 100 chemical products will be produced with the use of the most modern processing equipment available

Southern Representative:
DYER S. MOSS
1301 Liberty Life Bldg., Charlotte, North Caroline

New England Representatives:
E. L. LEGG • 8 Harding Ave., Providence, R. I.
CLARENCE E. MOSS • 19 Wilson Ave., Rumford 16, R. I.

California Representative
SIDNEY SPRINGER
2300 S. Vermont Ave., Los Angeles 7, California

Canadian Selling Agents:
BERKELEY PRODUCTS CANADA, LTD.
41 Hillcrest Ave., St. Catharines, Ontario, Canada

Exporting Agent: Chem-Col Company, 82 Wall St., New York City

Valuable additions to our line of . . .

Pharmasols*

Brown 2G produces a bright yellow Brown of excellent fastness to washing at a low cost.

Brown R produces a warm Brown of general all-around fastness.

Seal Brown yields a deep Brown at low cost and is of good all-around fastness.

THE THREE NEW BROWNS PRODUCE DESIRABLE TAN SHADES WHEN PRINTED IN REDUCED STRENGTH

THESE NEW BROWNS,

especially Seal Brown and Brown R, are easy to apply and show a very pronounced improvement in their

FASTNESS TO LIGHT

against our former Browns

*REG. U. S. PAT. OFF.

CARBIC COLOR AND CHEMICAL CO., INC.

451-453 Washington Street, New York City

BRANCHES:
PHILADELPHIA
PROVIDENCE HAMILTON, ONT.
CHARLOTTE, N. C.

IMPORTERS OF THE MANUFACTURES OF
DURAND & HUGUENIN S. A.
BASLE, SWITZERLAND

EXCLUSIVE DISTRIBUTORS OF
PHARMASOLS
PHARMOLS
PHARMACINES

Representative: Los Angeles (Hathaway Allied Products)

AMERICAN
DYESTUFF REPORTER
Incorporating Textile Colorist and Converter

NORMAN A. JOHNSON, B.T.C
Editor

MYRON D. REESER
Advertising Manager

GRACE B. BURTON
Production Manager

M. H. MORGAN
Circulation Manager

Official Publication of the Proceedings of the American Association of Textile Chemists and Colorists.

•

Published every other Monday by the **HOWES PUBLISHING COMPANY, INC.**, One Madison Avenue, New York 10, N. Y. **C. R. Howes**, President; **Harry F. Crawford**, Executive Vice-President; **L. R. Keeffe**, Vice-President; **Ernest J. Finan**, Treasurer; **Norman A. Johnson**, Secretary; **C. Essenbreis**, Assistant Secretary

•

Also Publishers of
HOSIERY INDUSTRY WEEKLY
HOSIERY MERCHANDISING

•

MARCH 21, 1949
VOLUME 38 NUMBER 6

Contents

Contents of previous issues can be found by consulting the Industrial Arts Index and the Engineering Index, Inc. at your library

• Special Articles

Deterioration of Cotton Textiles Exposed to the Weather 253
Herman Bogaty

• Departments

Abstracts 259
Book Reviews 281
Trade Notes—New Products 284

• Proceedings of the American Association of Textile Chemists and Colorists

One Hundred and Sixty-Fifth Council Meeting....P262

Piedmont Section to Meet April 2nd.....P266

Membership Applications P266

Report, LTI Student Chapter P267

Calendar P267

Employment Register P267

Report, Hudson-Mohawk Section P267

Photographic Aids to the Textile Industry.....P268
Melvin Siegel

Trade Practice Rules and Test Procedures for Textiles P274
Henry Miller

Changing Aspects in Dyeing and Finishing.....P276
L. S. Thompson

Copyright, 1949, Howes Publishing Co., Inc.

wherever color is used
Specify *National Aniline Dyes*

For Complete Satisfaction on Dyestuffs, Formulas and Application Service in your Mill

NATIONAL ANILINE DIVISION • ALLIED CHEMICAL & DYE CORPORATION
40 RECTOR STREET, NEW YORK 6, N.Y. BOSTON • PROVIDENCE • PHILADELPHIA • CHICAGO • SAN FRANCISCO • PORTLAND ORE GREENSBORO • CHARLOTTE • ATLANTA • NEW ORLEANS • CHATTANOOGA • TORONTO

AMERICAN
DYESTUFF REPORTER

VOLUME 38 MARCH 21, 1949 NUMBER 6

DETERIORATION OF COTTON TEXTILES EXPOSED TO THE WEATHER

HERMAN BOGATY
National Bureau of Standards, Washington, D. C.*

I. Introduction

THE evaluation of textile materials for resistance to weathering through exposure out-doors leads to many complex problems. These problems have occupied the attention of textile chemists and technologists for many years, and stimulated by the needs of the military services, much attention has been given to the production and evaluation of weather and mildew resistant finishes. The results of exposure tests have often been found to be extremely variable. The components of the "weather" which operate to produce textile degradation have not been clearly or completely defined. This adds to the difficulty in designing field experiments and in their evaluation. It makes necessary the constant repetition of a large number of exposures in many differing climates, in order to learn which factors require measurement as well as how to evaluate the changes that occur.

The data presented in this paper are a part of those obtained in the course of an investigation of some aspects of "tropical" deterioration of cotton textiles initiated at the National Bureau of Standards early in 1945 at the request of the National Defense Research Committee. They are presented for whatever contribution they may make to the solution of the complicated problem of weather deterioration of textiles, to confirm previous work, and to indicate avenues which seem promising as well as those which no longer do; they are neither complete nor final answers to the questions studied.

II. Data and Discussion

The various compounds used on the fabrics were applied by saturating the fabric in a solvent or water solution of the compound, as required. Distribution throughout the material was obtained by passing the saturated fabric, at full width, through squeeze rolls; uniformity of the distribution was checked by analysis.

The methods used to evaluate the degradation of exposed samples were changes in breaking strength, and in fluidity of a cuprammonium solution of the cotton *(1)*.

a. Does copper naphthenate accelerate deterioration of fabrics upon exposure to light?

This question has been answered variously by a number of investigators *(2, 3, 4, 7, 8)*, and was raised by many producers and purchasers of mildew-proofed fabrics during the war when a large volume of military fabrics was produced. The data shown in Table 1 indicate a very definite increase in the rate of degradation upon exposure when commercial copper naphthenate was applied to cotton fabrics. This may be seen more readily in Figure 1 where the cuprammonium fluidity values from Table 1 of the untreated fabrics are plotted against the corresponding values of the treated fabrics for the same exposure period. Were the deterioration rates of the treated and untreated fabrics similar, one would expect the points to cluster around the line of 45° slope drawn in the figure; it was found, however, that for a given exposure period, the fluidities of the treated materials were generally higher, indicating more rapid degradation. This does not necessarily mean that this compound is not a useful addition to textiles which will be subject to strong microbiological attack nor that it may not be useful in conjunction with a heavily pigmented, opaque finish.

Several other interesting facts may be noted in Table 1. The same treated fabrics seem to deteriorate *at about the same* rate without regard to place of exposure and climatic variables (compare finish No. 2, 4, 6, and 8), and irrespective of the amount of copper present (compare finish No. 11 and 12). This may be seen in Figure 2 in which cuprammonium fluidity values for one of the treated fabrics exposed at Washington, D. C., is compared with corresponding values of treated

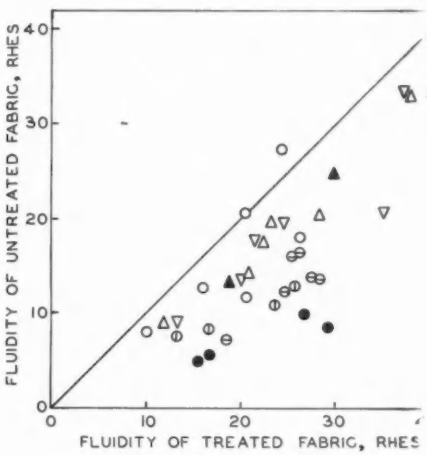


Figure 1. Comparison of the Deterioration of Untreated and Copper Naphthenate Treated Fabrics The cuprammonium fluidities of each untreated fabric and the treated fabric exposed simultaneously are shown.
Open circle—Army duck, 0.6% Cu, Washington, D. C
Open circle, horizontal bar—Same, Dickerson, Md
Open circle, vertical bar—Same, New Orleans, La
Solid circle—Same, Yuma, Arizona.
Open triangle, base down—Osnaburg, 0.3% Cu Washington, D. C.
Open triangle, base up—Osnaburg, 0.9% Cu, Washington, D. C.
Solid triangle—2-ounce balloon cloth, 1.2% Cu Washington, D. C.

* Present address: Harris Research Laboratories, 1246 Taylor Street, N. W., Washington 11, D. C.

TABLE 1—Change in Fluidity of Cuprammonium Solutions of Cotton Fabrics Upon Weathering.

Place of Exposure	Date of Start of Exposure	Code	Fabric and Finish	Initial Copper Content of Treated Fabric % Cu	Fluidity of Cuprammonium Solution of Fabrics After Exposure Facing South at an Angle of 45° From Horizontal, rhes — DAYS — 0	20	40	60	70	100	115	140	185	200	220
Washington, D. C.	May 1945	1	12 oz. Army duck, grey	—	1.9	—	8.2	12.7	—	20.8	—	18.1	—	—	27.2
		2	12 oz. Army duck, copper naphthenate treated	0.6	4.0	—	9.9	16.0	—	20.3	—	26.2	—	—	24.2
Yuma, Arizona	May 1945	3	12 oz. Army duck, grey	—	1.9	—	5.1	5.6	—	10.0	—	8.4	—	—	—
		4	12 oz. Army duck, copper naphthenate treated	0.6	4.0	—	15.6	16.5	—	26.6	—	29.2	—	—	—
New Orleans, La.	May 1945	5	12 oz. Army duck, grey	—	1.9	—	7.4	8.2	—	11.7	—	10.8	—	—	13.0
		6	12 oz. Army duck, copper naphthenate treated	0.6	4.0	—	13.3	16.7	—	20.6	—	23.9	—	—	25.6
Dickerson, Md.	May 1945	7	12 oz. Army duck, grey	—	1.9	—	—	—	7.2	12.2	16.1	13.6	13.6	—	16.5
		8	12 oz. Army duck, copper naphthenate treated	0.6	4.0	—	—	—	18.5	24.6	25.7	27.6	28.7	—	26.2
Washington, D. C.	May 1945	9	6 oz. osnaburg, grey	—	2.7	8.8	13.3	17.6	19.6	—	20.6	—	—	33.2	—
		10	6 oz. osnaburg, wax, (7%) treated	—	2.6	8.2	14.2	17.8	19.8	—	—	—	—	32.6	—
		11	6 oz. osnaburg, wax, and copper naphthenate treated	0.3	4.1	11.9	20.8	22.0	23.2	—	28.2	—	—	38.0	—
		12	6 oz. osnaburg, wax, and copper naphthenate treated	0.9	4.2	13.3	20.3	21.8	24.4	—	35.0	—	—	37.5	—
Washington, D. C.	April 1945	13	2 oz. balloon cloth	—	5.5	13.5	24.9	—	—	—	—	—	—	—	—
		14	2 oz. balloon cloth, copper naphthenate treated	1.2	—	18.6	29.7	—	—	—	—	—	—	—	—

fabrics exposed in other localities for the same exposure times. The clustering of the points around the line of unit slope indicates the similarity in behavior of these treated fabrics. It seems worthy of mention that the cuprammonium fluidities of the unexposed treated fabrics are consistently higher than those of the corresponding untreated unexposed fabrics. The fluidities of the treated fabrics stored in the dark for one and one-half years did not increase appreciably.

Typical curves for the breaking strengths corresponding to some of the data in Table 1 are shown in Figures 3 and 4. The congruency of the curves for the treated materials (Figure 3), as well as the leveling off of the degradation after about 140 days, is to be noted. This decrease in the rate of degradation may be attributed at least in part, to the decrease in rate of the reaction causing deterioration and/or the decrease in effective radiation in the fall of the year.

The greater degradation of the untreated fabric exposed at New Orleans is seen in Figure 4. This is due to microbiological attack and is shown in Figure 5. Certainly in exposures of this type commercial copper naphthenate is a useful finishing agent.

b. Do other substances in commercial copper naphthenate accelerate deterioration?

Experiments were designed to show the effect of naphthenic acids and of copper sulfate on the deterioration of cotton. Some of the data are shown in Table 2.

It has been suggested that copper sulfate *(8)* or other substances found in commercial copper naphthenate may contribute to the increase in rate of tendering

TABLE 2. Rate of Deterioration of Osnaburg With Various Finishes.

Samples were exposed facing south at an angle of 45° from horizontal starting in August 1945. The wax finish added was about 7% of paraffin based on the finished weight of the fabric. The amount of copper sulfate added to Nos. 13 and 23 was that estimated to be present in Nos. 11 and 21, respectively. For No. 33, fabric was passed through a Stoddard solvent treating bath in the same way as it was done for the Stoddard solvent solutions of the other treatments.

			Breaking Strength Retained, Average of Warp and Filling, After Exposure for the Following Days:											
			At Washington, D. C.						*At Dickerson, Md.*					
No.	*Treatment*	*Initial Copper Content*	20	40	60	90	150	200	20	40	60	90	150	200
		%	%	%	%	%	%	%	%	%	%	%	%	%
11	Commercial copper naphthenate and wax finish	1.4	89	81	65	61	56	46	95	78	63	58	56	51
12	Copper naphthenate prepared in the laboratory and wax finish	1.4	96	86	77	75	64	57	96	76	75	71	66	65
13	Same as 12 after pretreatment with aqueous Cu SO_4	1.4	89	76	71	61	64	52	88	75	66	67	62	61
21	Same as 11	0.4	86	78	62	66	59	49	90	77	68	59	62	52
22	Same as 12	0.4	90	85	70	75	64	52	95	71	79	73	73	60
23	Same as 13	0.4	86	77	71	63	61	44	89	81	69	63	60	57
31	Untreated control	—	93	86	79	77	70	57	97	88	91	85	86	75
32	Wax finish	—	99	91	74	76	67	58	107	84	84	84	82	77
33	Solvent treated	—	93	83	69	69	63	48	93	78	85	79	74	72

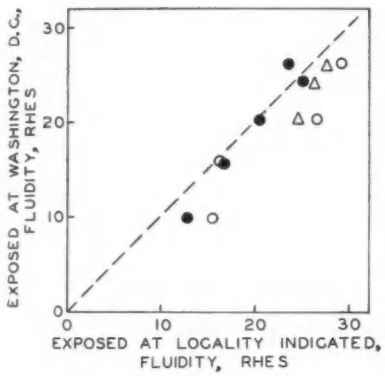


Figure 2. Comparison of the Deterioration of Copper Naphthenate Treated Duck Exposed at Washington, D. C. and at Three Other Localities.
The cuprammonium fluidities of the treated fabrics exposed simultaneously are shown.
Open circle—Yuma, Arizona.
Solid circle—New Orleans, La.
Open triangle—Dickerson, Md.

found on exposure of treated fabrics. Experiments were, therefore, initiated using a copper naphthenate prepared in the laboratory by reacting copper acetate and commercial naphthenic acid followed by careful washing. The weathering behavior of osnaburg treated with this compound, of fabric treated with the same compound after a pretreatment of copper sulfate, and of osnaburg treated with commercial copper naphthenate were compared. Some of these data are shown in Table 2.

For purposes of analysis, the data were plotted as shown in Figures 6 through 10. A line of 45° slope is drawn in each case such that where the points cluster about this line one may conclude that the variable in question (type or amount of treatment, locality of exposure) is not effective in promoting the rate of deterioration of the fabric. In Figure 6, the effect of copper naphthenate prepared in the laboratory (treatments 12 and 22, Table 2) is compared with that of commercial copper naphthenate (treatments 11 and 21, Table 2), and with the effect of copper naphthenate prepared in the laboratory and applied after the osnaburg had been treated with copper sulfate. In general, the points are below the line of unit slope showing that the commercial compound and the laboratory copper naphthenate plus free copper sulfate increase the rate of deterioration of the osnaburg.

It was then of interest to know whether the copper naphthenate prepared in the laboratory had any deteriorating effect on the osnaburg, hence treatments No. 12 and 22 were compared with the untreated control in Figure 7. The results surprisingly show that the osnaburg treated with copper sulfate-free copper naphthenate deteriorated at about the same rate as did the untreated control when exposed at Washington, D. C., but lost its strength more rapidly than the untreated control when exposed 40 miles away at Dickerson, Maryland.

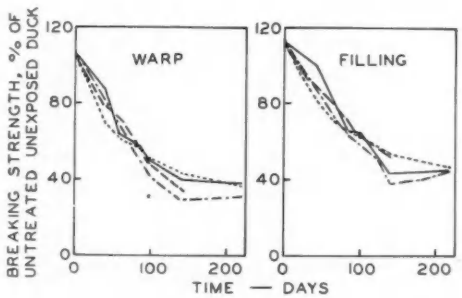


Figure 3. Deterioration of Copper Naphthenate Treated Cotton Duck Exposed Outdoors in Several Localities.
Deterioration is expressed as the strength retained.
Initial Cu content of duck 0.6%.
Exposure started in May 1945.
Solid line—Washington, D. C.
Dotted line—New Orleans, La.
Dash-dot—Dickerson, Md.
Dash-dash—Yuma, Arizona.

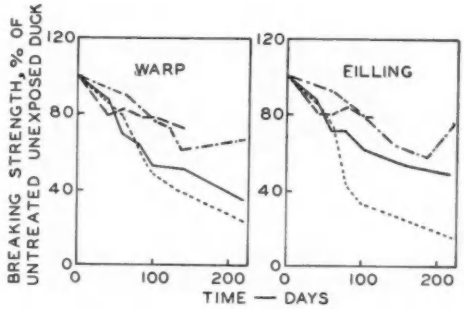


Figure 4. Deterioration of Untreated Cotton Duck Exposed Outdoors in Several Localities.
Deterioration is expressed as the strength retained.
Exposure started in May 1945.
Solid line—Washington, D. C.
Dotted line—New Orleans, La.
Dash-dot—Dickerson, Md.
Dash-dash—Yuma, Arizona.

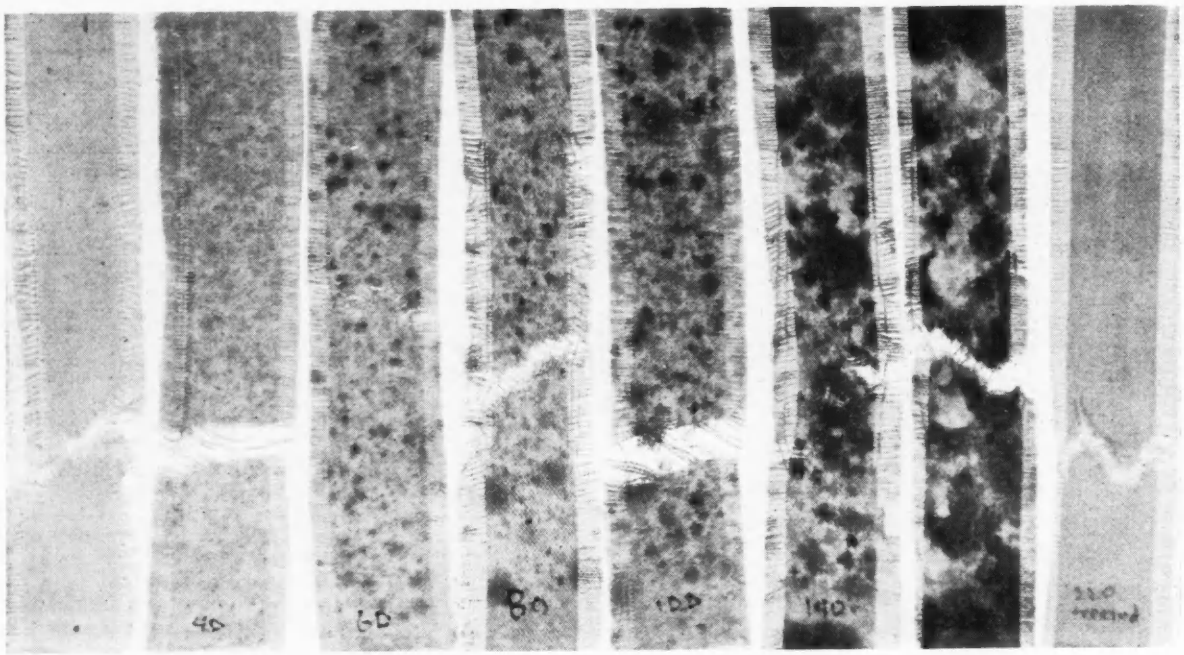


Figure 5. Appearance of Duck Exposed at New Orleans.
Left to right: unexposed; untreated duck exposed for 40, 60, 80, 100, 140, 220 days; copper naphthenate treated duck exposed for 220 days. The dark areas are micro-organism growths.

TABLE 3. Antioxidants in Weathering of Duck

Treatment[a]	*Washington, D. C. —6 Mo.* Residual Strength Warp	Filling	Relative Rating	*Yuma, Ariz. —6 mo.* Residual Strength Warp	Filling	Relative Rating	*New Orleans, La. —7.3 mo.* Residual Strength Warp	Filling	Relative Rating
	%[b]	%[b]		%[b]	%[b]		%[b]	%[b]	
Copper naphthenate, 0.8% Cu	31	52	6.5	28	45	6	29	44	2
Hydroquinone, 2%	32	46	3	61	56	3	27	19	6.5
Pyrogallol, 2%	35	52	1	63	76	2	31	20	4.5
Hydroquinone, 2% + copper naphthenate, 0.8% Cu	28	35	6.5	29	38	8	28	43	3
Alpha naphthol, 2%	28	33	8	35	45	4.5	26	19	6.5
Pyrogallol, 2% + copper naphthenate, 0.8% Cu	34	47	2	31	48	4.5	44	61	1
Alpha naphthol, 2% + copper naphthenate, 0.8% Cu	28	39	5	25	45	7	22	30	4.5
Untreated control	32	44	4	69	79	1	16	13	8

(a) Percentage based on finished weight of fabric.
(b) Based on strength of untreated unexposed fabric.

This led us to inquire whether the fabric treated with the laboratory-prepared copper naphthenate (treatment No. 12, Dickerson, Table 2) weathered differently in different localities (treatment No. 12 and 22, Washington, Table 2) or weathered differently when the fabric contained different amounts of initial copper (treatment No. 22, Dickerson, Table 2). The data obtained seem to indicate that the treatments with the laboratory-prepared compound affect the fabrics to approximately the same degree irrespective of locality of exposure or initial copper content.

This must then mean that the results shown in Figure 7 are explicable in terms of difference of behavior of the untreated osnaburg at the two exposure stations. This is borne out in Figure 8 which compares the data for the untreated control (No. 31), solvent extracted (No. 33), and wax treated (No. 32), for each of the locations. The trend is clear that for the fabrics not containing copper treatments, exposure at the Washington, D. C., station is more severe than at Dickerson, Maryland.

A probable explanation for these results lies in a consideration of the different environments. The exposure panels at Washington were situated on the roof of one of the buildings of the National Bureau of Standards, close to a power plant stack, chemical hood vents, laboratory exhausts, etc. The panels at Dickerson were on Sugar Loaf Mountain in a field considerably removed from any building, city, or other potential source of industrial air contaminates. The climatological data available suggests that such factors as amount of sunshine, rainfall, temperature and humidity are not very different for the two places and indeed one would not expect much difference in 2 areas 40 miles apart. Therefore, one must conclude from this series of experiments that copper sulfate-free copper naphthenate deteriorates fabrics less rapidly than copper naphthenate containing free copper sulfate; however, in comparing the treated with untreated fabrics, the possible presence and effect of acidic atmospheric contaminants must be considered. Where atmospheric contaminants are not likely present, even laboratory-prepared copper naphthenate accelerates loss in strength to some extent. It is interesting in this connection to note in Figure 1, that the Army duck exposed at Washington (open circles) shows similar behavior even with respect to commercial copper naphthenate; the cuprammonium fluidities for the untreated duck plotted against the corresponding values for the duck treated with commercial copper naphthenate do

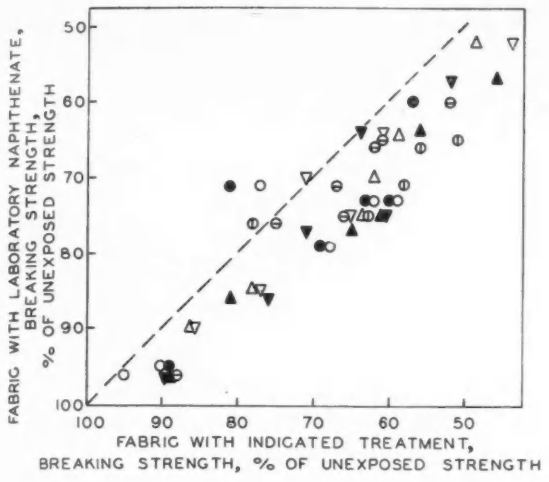

FABRIC WITH LABORATORY NAPHTHENATE, BREAKING STRENGTH, % OF UNEXPOSED STRENGTH
FABRIC WITH INDICATED TREATMENT, BREAKING STRENGTH, % OF UNEXPOSED STRENGTH

Figure 6. Effect of Certain Constituents of Commercial Copper Naphthenate on the Rate of Deterioration of Treated Fabrics. Breaking strength (average of warp and filling) of osnaburg treated with laboratory-prepared copper naphthenate is compared with that of osnaburg similarly treated with additions of certain substances, and with osnaburg treated with commercial copper naphthenate. Fabrics were exposed in two localities. Comparisons are between fabrics exposed simultaneously.

Fabric exposed at: Dickerson, Md.	Washington, D. C.	Treatment
Open circle	Open triangle, base down	Commercial Cu naphthenate, 0.4% Cu
Solid circle	Open triangle, base up	Laboratory Cu naphthenate plus $CuSO_4$, 0.4% Cu
Open circle, vertical bar	Solid triangle	Commercial Cu naphthenate, 1.4% Cu
Open circle, horizontal bar	Solid triangle, base up	Laboratory Cu naphthenate plus $CuSO_4$, 1.4% Cu

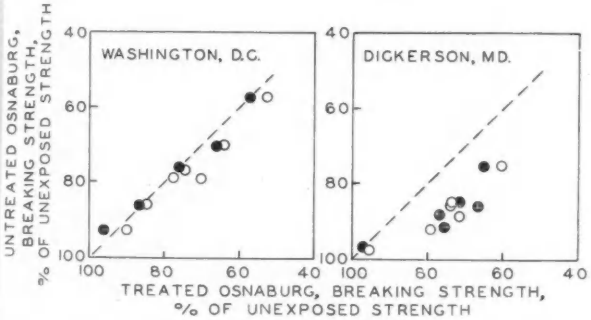

UNTREATED OSNABURG, BREAKING STRENGTH, % OF UNEXPOSED STRENGTH
WASHINGTON, D.C.
DICKERSON, MD.
TREATED OSNABURG, BREAKING STRENGTH, % OF UNEXPOSED STRENGTH

Figure 7. Comparison of the Deterioration of Untreated Osnaburg and Osnaburg treated with Laboratory-Prepared Copper Naphthenate. Fabrics were exposed for the same periods of time.
Open circle—Fabric contained 0.4% Cu.
Solid circle—Fabric contained 1.4% Cu.

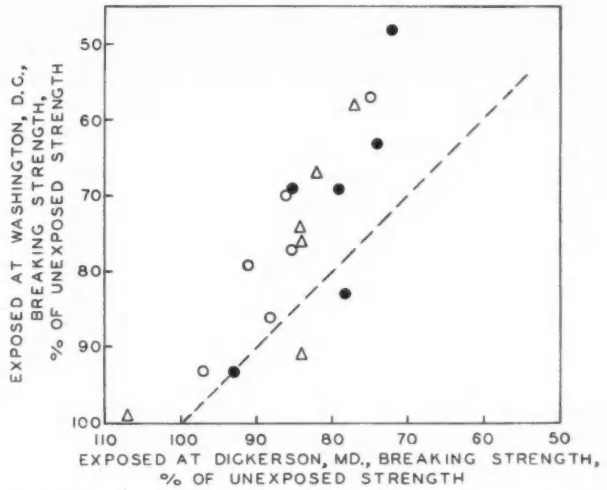

EXPOSED AT WASHINGTON, D.C., BREAKING STRENGTH, % OF UNEXPOSED STRENGTH
EXPOSED AT DICKERSON, MD., BREAKING STRENGTH, % OF UNEXPOSED STRENGTH

Figure 8. Comparison of the Deterioration of Untreated, Solvent Extracted, and Wax Treated Osnaburg Exposed Simultaneously in Two Localities.
Open circle—Untreated osnaburg.
Solid circle—Solvent extracted osnaburg.
Open triangle—Paraffin wax treated osnaburg.

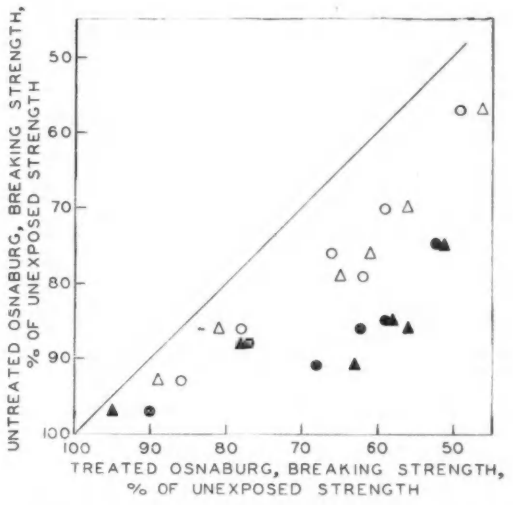

UNTREATED OSNABURG, BREAKING STRENGTH, % OF UNEXPOSED STRENGTH
TREATED OSNABURG, BREAKING STRENGTH, % OF UNEXPOSED STRENGTH

Figure 9. Comparison of the Deterioration of Untreated and Commercial Copper Naphthenate Treated Osnaburg Exposed Simultaneously in Two Localities.
Open circle—Fabric contained 0.4% Cu, Washington, D. C.
Solid circle—Fabric contained 0.4% Cu, Dickerson, Md.
Open triangle—Fabric contained 1.4% Cu, Washington, D. C.
Solid triangle—Fabric contained 1.4% Cu, Dickerson, Md.

tend to cluster around the line of unit slope.

Two other points of interest were found in this series of experiments. The tendency for osnaburg treated with commercial copper naphthenate to deteriorate more rapidly than the untreated fabric is confirmed in Figure 9. Here again the exposures at Dickerson show this difference to a greater extent, not because the copper treatment is more deleterious at Dickerson but because the untreated fabric is more susceptible at Washington.

Finally Figure 10 shows a comparison between weathering of solvent extracted osnaburg and untreated cloth. The solvent treated cloth apparently is weaker at corresponding exposure times. This suggests that the natural waxes in the gray fabric do offer some protection during exposure for a surprisingly long time.

c. Will phenyl salicylate, (salol), an ultraviolet radiation absorber, inhibit the deterioration of cotton textiles?

This question was suggested by the successful use of salol in inhibiting photochemical degradation of cellulose plastics *(5)*. Salol was applied to cotton fabrics alone and with finishes containing copper naphthenate or pentachlorphenol. The fabrics were exposed in the National Carbon Acclerated Weathering Unit and out of doors at Washington, D. C. In no

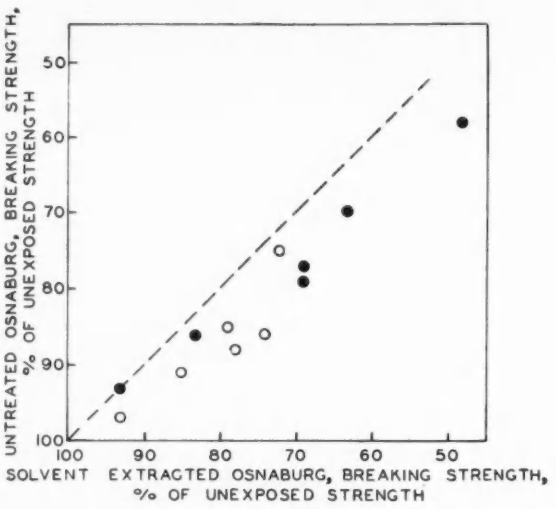


Figure 10. Comparison of the Deterioration of Untreated and Solvent Extracted Osnaburg Exposed Simultaneously in Two Localities.
Open circle—Fabric exposed at Dickerson, Md.
Solid circle—Fabric exposed at Washington, D. C.

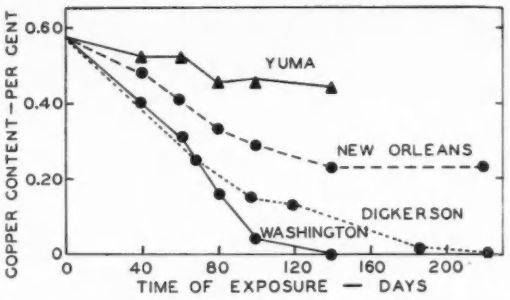


Figure 11. Effect of Weathering on the Copper Content of Copper Naphthenate Treated Duck.

instance did the presence of salol confer any better weathering resistance to the fabrics. This is confirmed by the data of Barghoorn *(3)*.

d. Will anti-oxidants inhibit the degradation of fabrics upon weathering?

Experiments were carried out to evaluate the usefulness of some phenolic antioxidants in inhibiting the accelerating effect of copper naphthenate in tendering duck. The work was based on the assumption that the copper is oxidative in nature.

Hydroquinone, pyrogallol and alpha-naphthol were each applied to 12 oz. Army duck alone and with copper naphthenate. Samples of the fabrics were exposed at Washington, D. C., at Yuma, Arizona, and at New Orleans, La., starting in March 1945. The results are shown in Table 3. The column headed "Relative Rating" provides a measure of the resistance to weathering. These values were found by tabulating the sum of the residual warp and filling strengths in decreasing order such that the highest value was first and the lowest value eighth. Thus a rating of 1 indicates highest resistance to degradation, 2 next best, and so on. In view of the considerable variability and the small differences, the consistency with which a given finish appears high or low in the scale was judged to be of some significance in evaluation of the treatment.

Upon examination of Table 3, it is seen that fabrics finished with pyrogallol alone or in combination with copper naphthenate are generally high on the quality scale, losing their strength to a smaller extent than do the fabrics with the copper naphthenate finish. The fabric treated with pyrogallol is as good or better than the untreated control, as is that finished with the pyrogallol-copper naphthenate combination except in the exposures at Yuma. In the latter case, the pyrogallol-copper naphthenate treatment appears to be the best of the copper containing finishes and this is the case at all exposure stations.

In analyzing these data it should be remembered that at New Orleans, microbiological tendering comprises an important portion of the total degradation. Thus in the New Orleans exposures, the untreated fabric is found to be affected to the greatest extent and most rapidly.

The mechanism of the action of pyrogallol was not studied. It is possible that it affects the pH relationships and/or that a reaction occurs between the copper compound and the pyrogallol making the former less available for catalytic activity. It seems unlikely that such a strong reducing agent would remain very long unchanged upon exposure. Another possible mechanism lies in the bonding of the pyrogallol to the cellulose molecule in some way so as to block those groups which are the point of attack in copper catalysed deterioration.

e. What climatological factors are important in the tendering of exposed fabrics?

In connection with the exposures of duck (No. 1-8, Table 1) in 4 different localities, the detailed Weather Bureau data for rainfall, temperature, amount of sunshine, and relative humidity were studied. No conclusion could be drawn as to the role of these factors in textile deterioration. The weather data for the period of exposure summarized in Table 4, give an overall picture of the climate at each location.

The loss of copper during exposure is shown in Figure 11. It is noteworthy that the loss of copper at Yuma occurs largely in the first 80 days when there was no rainfall. The total copper content de-

TABLE 4. Summary of Weather Data at Three Exposure Stations

	Washington	*Yuma*	*New Orleans*
Total rainfall, in.	31.8	2.3	41.6
Avg. percent sunshine	62	89	67
Mean temperature, °F.	64	75	73
Avg. max. temperature, °F.	74	90	81
Avg. min. temperature, °F.	55	61	65
Avg. relative humidity, %	71	39	76

Complete data were not available for Dickerson. Its climate is similar to that of Washington.

TABLE 5. Copper Phenylnaphthenate Compared with Copper Naphthenate Finish Applied to Osnaburg, Both with 7% Wax Water Repellent.

	Copper Phenylnaphthenate (0.4% Cu)	*Copper Naphthenate (0.4% Cu)*
Fluidity in cuprammonium solution after outdoor exposure of:		
0 days	4.8	4.1
20 days	12.8	11.9
70 days	26.6	23.2
115 days	32.4	28.2
Approx. No. of weeks of soil burial to produce breaking strength loss of:		
50%	2½	1½
90%	4	3

creased less rapidly at New Orleans than at Washington and at Dickerson despite considerably higher rainfall. It seems clear that other factors such as condensation, the frequency of the rainfall, and atmospheric contaminants may be important.

f. How does the manner of exposure affect the results obtained?

Fabrics were exposed on wooden frames with plywood backing 1-inch from the fabric and without the plywood backing, leaving the fabric freely open to the air on both surfaces. All fabrics exposed to the sunlight, facing south at an angle of 45°, tendered about 10% slower when mounted on the open back frames probably because of freer circulation of air and more rapid drying. Fabrics exposed in a vertical position facing north and in several positions in a woods away from the sun, showed too little deterioration during the period studied to warrant discussion. The strength loss in 200 days for all vertical north exposures at Washington, D. C., and at Dickerson, Maryland, in an open field and at Dickerson, Maryland, in the woods facing south at 45° was on the order of 10%.

g. How suitable is copper phenylnaphthenate as a fungicidal agent?

This compound was a rather new development when some of this work was started. Fabrics containing 0.4% copper as the phenylnaphthenate were compared with comparable copper naphthenate finishes.

The results are shown in Table 5.

The osnaburg with 0.4% copper as phenylnaphthenate deteriorated at about the same rate as the osnaburg with the same amount of copper as naphthenate on weather exposure but was somewhat more resistant to soil burial.

III. Summary of Results

1. Cotton fabrics treated with copper naphthenate deteriorated more rapidly on outdoor exposure than did untreated fabrics.

2. Free copper sulfate does in general contribute to the acceleration of tendering. Copper naphthenate prepared in the laboratory from copper acetate was not as effective a fungicide with respect to soil contact as commercial copper naphthenate.

Conclusions as to rate of tendering of treated fabrics compared ith untreated must be carefully considered in the light of possible factors which may affect the untreated more than the treated materials.

3. Phenyl salicylate, (salol), an ultraviolet radiation absorber, did not inhibit or decrease degradation of cotton exposed to weathering.

4. Pyrogallol gave some promise of decreasing weathering degradation of fabrics. Further work with it is indicated.

5. The role of the agencies comprising "weather" requires further elucidation. Fabrics lose copper when exposed in a dry climate without rainfall. The amount lost is not determined by the amount of rainfall alone.

6. Fabrics treated with copper phenylnaphthenate deteriorated at about the same rate as when treated with copper naphthenate in weathering exposures but were somewhat more resistant to soil contact.

IV. Acknowledgment

The aid of several of the members of the NDRC Tropical Deterioration Subcommittee on Textiles and Cordage, especially Dr. Leland Shanor, and Messrs. William D. Appel and Rees F. Tener, is gratefully acknowledged. Dr. Clara M. Szego initiated some of the experiments with anti-oxidants during her brief service with the Bureau. Misses Dorothy A. Rundles, Frances Dodge, and Ruth E. Dowden performed much of the labor of preparing and testing samples incidental to this investigation. Miss Josephine Blandford aided in the preparation of the graphs. The suggestions of Dr. Herbert F. Schiefer on presentation of some of the data are greatly appreciated.

References

1. R. T. Mease, J. Research NBS *22*, 271 (1939), RP1179; *27*, 551 (1941), RP1442.
2. R. G. Fargher, J. Soc. Dye Col. *61*, 118 (1945); also "The Incidence and Control of Mould and Bacterial Attack on Textiles", pamphlet published March 1945, by British Cotton Industries Research Association.
3. E. S. Barghoorn, OQMG, Research and Development Branch, Textile Series Report No. 24, Microbiological Series Report No. 4, June 1946; also OSRD Report No. 4807, April 1945.
4. A. B. Cox, W. R. Hindson, K. N. Mortensen, and G. C. Wade, Munitions Supply Laboratories (Australia) Report No. 170, November, 1945.
5. L. W. A. Meyer and W. M. Gearhart, Ind. Eng. Chem. 37, 232 (1945)
6. Supplement to Federal Specification CCC-T-191a dated October 8, 1945.
7. C. H. Bayley and M. W. Weatherburn, Can. J. Research F*24*, 193 (1946).
8. A. E. Bartlett and M. Goll, Amer. Dyestuff Rep. *34*, 225 (1945).

ABSTRACTS

A Systematic Investigation of the Color and Dyeing Properties of the Aminoacridines. Part II—Diaminoacridines and Substituted Monoaminoacridines

C. L. Bird, The Journal of the Society of Dyers and Colourists, page 357, Vol. 64, No. 11, November, 1948.

This paper is summarized as follows:

The color and fastness properties on tanned cotton of a number of diaminoacridines and substituted monaminoacridines, particularly derivatives of 5-aminoacridine, have been examined. Derivatives of 5-aminoacridine are almost always pale yellow, and show better fastness to light and to wet treatments than do most basic dyes. Derivatives of 1-, 2-, 3-, and 4-aminoacridine and diaminoacridines exhibit a variety of hues, e.g. rose and violet as well as the familiar shades of yellow and orange, but they all show poor fastness to light and wet treatments.

The Application of Chrome Dyes to Nylon Textiles

H. R. Hadfield and D. N. Sharing, The Journal of the Society of Dyers and Colourists, page 381, Vol. 64, No. 12, December, 1948.

The afterchrome method was found to give fairly satisfactory results with a number of chrome dyes when applied to nylon in medium and heavy shades. It was necessary to use larger quantities of potassium dichromate and stronger acids when applying these dyes to nylon and to carry out the chroming treatment at the boil in order to obtain lake formation. Dangers arising from such a procedure include: solutions of low pH give marked degradation of nylon at high temperatures; complete formation of the chromium-dye complex is not obtained in every case; residual chromate, which is not removed by a single washing treatment, has a powerful tendering action on nylon; chrome dyes are decomposed to different extents by strong oxidizing agents.

The rate and degree of absorption of the potassium dichromate by dyed and undyed nylon was investigated. It was indicated that potassium dichromate in acid solution is absorbed by nylon in the same manner as hydrochloric acid and level dyeing acid dyes, i.e. on the positively charged free amino end groups. Figures show the rate and degree of absorption of potassium dichromate at pH 3 at 95°C. and 70°C. on nylon dyed with 1% of chrome dyes containing sulfonic acid groups. The initial rate of absorption at both temperatures is similar to that on undyed nylon but the quantity absorbed in the first 10 minutes is less. It is considered that the initial uptake corresponds to absorption of dichromate by those charged amino groups which are not occupied by the dye. Following this initial rapid absorption there is a slower rate of uptake of dichromate which is de-

pendent upon the temperature, the higher the temperature the more rapid the absorption. It is thought that this stage corresponds to a slow reduction of the dichromate within the nylon and the corresponding change from a dichromate anion to the chromic cation results in vacation of a positively charged amino group. As this process is repeated a concentration of chromium within the nylon is reached which may exceed the normal saturation value.

A range of chrome dyes were dyed, chromed, and reduced, and the following general method (patent protection pending) for their application was evolved:

"The cold dyebath is set with dye and 3% of acetic acid (30%). The material is entered, and while turning, the temperature of the dyebath is raised to 90-100°C. during twenty minutes. After a further ten minutes at this temperature 3% of formic acid (85%) is added, and the dyeing continued for a further ten minutes or until exhaustion is complete. 0.5% of potassium or sodium dichromate is now added, and chroming continued for one hour, after which reduction is effected, e.g. by the addition of 2.5% of sodium thiosulfate. Thirty minutes are allowed to complete the reduction and chelation. When dyeing heavy shades it is frequently found that the dyebath is not completely exhausted, and in such cases chroming is advisable in a fresh bath set with 4% of formic acid (85%). For heavy shades 1% of dichromate is recommended and for blacks it is advisable to use 2% of dichromate. In all cases the amount of thiosulfate should be five times the amount of dichromate used. If desired, the initial rate of absorption of the dye can be reduced by commencing dyeing with a dyebath set with 3% of ammonium aceate or, more severely, 3% of ammonium acetate plus 0.5% of ammonium (sp. gr. 0.910)."

This method does not alter the characteristic behavior of chrome dyes on nylon but does provide a means for producing dyeings of outstanding fastness properties. It is especially suitable for yarn but the application to fabric is limited by the difficulty of having the liquor surrounding the nylon reach a temperature of at least 90°C. A list of the most suitable dyes, together with their fastness properties, is given.

Some Defects Arising in the Finishing of Woolen and Worsted Fabrics

C. S. Whewell, The Journal of the Society of Dyers and Colourists, page 9, Vol. 65, No. 1, January, 1949.

This paper consists of a discussion of the more common faults which occur according to the following headings: *Preliminary Processes; Setting Processes* (inadequate setting, damaged and weak cloth, color bleeding, uneven treatment, creases, stains); *Scouring* (oil stains, dirty pieces, loss of handle, yellowing and color bleeding, washer marks, cockled pieces, excessive shrinking, faults caused by allowing wet pieces to lie about, curled lists, holes in pieces, stains); *Milling; Drying; Raising; Finishing.*

Trends in Knit Goods Call for Better Finishing

Leslie L. Walmsley, Textile World, page 116, Vol. 99, No. 1, January, 1949.

This is a rather complete article which describes the processes involved in the dyeing and finishing of knit fabrics according to the following classification: *circular knit*—cotton, filament-viscose rayon, nylon, wool, spun rayon, mixtures of rayon and wool, nylon and wool, and cotton and wool; *tricot knit*—filament acetate, viscose, nylon, and various spun fibers.

Color and Constitution. Part X—Diazonium Salts

H. H. Hodgson, The Journal of the Society of Dyers and Colourists, page 361, Vol. 64, No. 11, November, 1948.

This paper is summarized as follows: Previous theories relating to the color of certain diazonium salts, in particular those of Hantzsch and Morgan are reviewed, and in general are found to be included, with their limitations explained, in the more comprehensive modern resonance theory of color as developed by Lewis and Calvin, Pauling, Bury and others. On this theory, Morgan's colorless diazonium salt from *N*-benzoyl-*p*-phenylenediamine and colored diazonium salts from *N*-benzoyl-1:4-naphthylenediamine receive adequate interpretation, as also do his colored *mono-* and *bis*-diazonium salts from 2:7-diaminonaphthalene.

Color and Constitution Part XI—The Aminocoumarins

H. H. Hodgson, The Journal of the Society of Dyers and Colourists, page 14, Vol. 65, No. 1, January, 1949.

This paper is summarized as follows: The fact that all the aminocoumarins are yellow, whereas coumarin itself is colorless, may be explained on modern resonance theory, which provides also a qualitative explanation of differences in depth of color based on facility of resonance. The rhythmic field effect suggested by Clayton is now shown to be without theoretical support.

Adsorption of Surface-Active Agents by Fibers

J. C. Harris, Textile Research Journal, page 669, Vol. XVIII, No. 11, November, 1948.

This paper considers anionic, cationic and nonionic type surface-active agents and their removal from solutions by textile fibers.

The data show that cotton has a low adsorption of the anionic and nonionic surface-active agents whereas wool, because of its different physical and chemical structure, adsorbs comparatively large amounts. Important factors governing the adsorption by wool are pH, temperature, time, the molecular arrangement of the surface-active agent and concentration.

The mechanism of adsorption with relation to specific fibers is discussed.

Dyeing Studies at Elevated Temperatures: Use of Temperatures Between 200°F. and 300°F.

G. L. Royer, C. L. Zimmerman, H. J. Walter and R. D. Robinson, Textile Research Journal, page 598, Vol. XVIII, No. 10, October, 1948.

Using a small laboratory high-temperature dyeing machine operating under a pressure of 50 lbs. per square inch and at temperatures between 200°F. and 300°F., a study was made of the effect of high temperatures on the dyeing of various textile fibers.

The data obtained indicate that high temperature dyeing methods can be used with results equivalent to normal dyeing procedures as regards physical characteristics as well as fastness. In addition, greater penetration is obtained at high temperatures, the speed of dyeing is increased considerably, and in some cases added color value is obtained.

Although a disadvantage of high-temperature dyeing is the thermal decomposition of dyes, this characteristic of a large number of acid and direct dyes was investigated and the amount of decomposition determined.

Publications Abstracted in this Issue

Textile World—McGraw-Hill Publishing Co., 330 West 42nd Street, New York 18, N. Y.

The Journal of the Society of Dyers and Colourists—The Society of Dyers and Colourists, 31-34 Piccadilly, Bradford, Yorkshire, England.

Textile Research Journal—Textile Research Institute, 10 East 40th Street, New York 16, N. Y.

Proceedings of the
American Association of Textile Chemists and Colorists

Copyright, 1949, American Association of Textile Chemists and Colorists

March 21, 1949

National Officers of the Association

President
HENRY F. HERRMANN
General Dyestuff Corp.,
435 Hudson Street, New York 14, N. Y.

Vice-Presidents
C. NORRIS RABOLD
The Erwin Cotton Mills Co.
Cooleemee, North Carolina
JOHN N. DALTON
Pacific Mills, Lawrence, Massachusetts

Treasurer
WILLIAM R. MOORHOUSE
National Aniline Division, Allied Chemical & Dye Corp., 150 Causeway Street, Boston 14, Massachusetts

Secretary
HAROLD C. CHAPIN
Lowell Textile Institute, Lowell, Massachusetts

President Emeritus
LOUIS A. OLNEY
Lowell Textile Institute, Lowell, Massachusetts

Chairman of the Research Committee
J. ROBERT BONNAR
General Dyestuff Corp.,
435 Hudson Street, New York 14, N. Y.

Director of Research
HAROLD W. STIEGLER
Lowell Textile Institute, Lowell, Massachusetts

Councilors

Representing Sections

Rhode Island: GEORGE H. WOOD, JR., RAYMOND W. JACOBY, RALPH F. CULVER.
Philadelphia: ONSLOW B. HAGER, M. H. KLEIN, FREDERICK V. TRAUT, LLOYD O. KOONS, WALTER F. FANCOURT, 3rd.
New York: WINN W. CHASE, WILLIAM A. HOLST, JR., FRANCIS S. RICHARDSON, CHARLES W. DORN, HERMAN E. HAGER, HERMAN E. WILDE.
Northern New England: KENNETH R. FOX, GEORGE O. LINBERG, C. WENDALL LEVER.
Piedmont: JOHN B. NEELY, WYSS L. BARKER, LELAND G. ATKINS.
Southeastern: A. KEMPTON HAYNES, WALTER M. SCOTT.
South Central: JACK ANDERSON.
Mid-West: ELMER F. SMITH, GORDON M. MARKLE.
Western New England: HAROLD H. TAYLOR.
Hudson-Mohawk: ALBERT E. HERRMANN, JR.

Past Presidents
ELVIN H. KILLHEFFER, P. J. WOOD, WILLIAM H. CADY, ALBAN EAVENSON, CARL Z. DRAVES, THOMAS R. SMITH, WILLIAM D. APPEL.

Standing Committees of the Council and their Chairmen

Executive Committee on Research
J. ROBERT BONNAR, *Chairman*

Publicity
PAUL J. LUCK, *Chairman*

Conventions
KENNETH H. BARNARD, *Chairman*

Appropriations
WILLIAM R. MOORHOUSE, *Chairman*

Constitution and Bylaws
HAROLD C. CHAPIN, *Chairman*

Membership and Local Sections
JOHN N. DALTON, *Chairman*

Corporate Membership
LEONARD S. LITTLE, *Chairman*

Publications
LOUIS A OLNEY, *Chairman*

Technical Programs
ARTHUR W. ETCHELLS, *Chairman*

Local Sections and their Officers

Northern New England Section

Chairman
FRANK J. O'NEIL
Pacific Mills
Lawrence, Massachusetts

Secretary
AZEL W. MACK
Dexter Chemical Corp., 561 Boylston St., Boston 16, Massachusetts

Vice-Chairman — RALPH E. HALE
Treasurer — MARTIN H. GURLEY, JR.

Rhode Island Section

Chairman
ROBERT W. JOERGER
Franklin Process Co., 546 Eddy St., Providence, Rhode Island

Secretary
EMORY A. RICHARDS
Airedale Worsted Mills, Inc., 1 Main Street, Woonsocket, Rhode Island

Vice-Chairman — ELLIOT BROADBENT
Treasurer — ROBERT R. FARWELL

New York Section

Chairman
CHARLES W. DORN
J. C. Penney Co., 330 West 34th Street, New York 1, N. Y.

Secretary
NORMAN A. JOHNSON
American Dyestuff Reporter, One Madison Ave., New York 10, N. Y.

Vice-Chairman — PAUL J. LUCK
Treasurer — JOHN H. HENNESSEY

Philadelphia Section

Chairman
JAMES DIXON
Calco Chemical Division, American Cyanamid Co., 401 N. Broad Street, Philadelphia, Pennsylvania

Secretary
THOMAS H. HART
Hart Products Corp., P. O. Box 5020, Philadelphia 11, Pennsylvania

Vice-Chairman — RICHARD B. STEHLE
Treasurer — A. E. RAIMO

Piedmont Section

Chairman
PELHAM EUGENE SMITH
Riegel Textile Corp.,
Ware Shoals, South Carolina

Secretary
EDWIN A. BRIGGS
Southern Franklin Process Co.,
Greenville, South Carolina

Vice-Chairman — ROBERT H. SMITH
Treasurer — R. HOBART SOUTHER

South Central Section

Chairman
WILBUR K. NEWMAN
Peerless Woolen Mills, Rossville, Georgia

Secretary
HOWARD P. LOVELESS
Crystal Springs Bleachery, Chickamauga, Georgia

Vice-Chairman — JOSEPH H. O'NEIL
Treasurer — CHARLES GORDON

Mid-West Section

Chairman
JOSEPH H. JONES
Phoenix Dye Works, 1963 Southport Ave., Chicago 14, Illinois

Secretary
WILLIAM BOYD, JR.
Ciba Company, Inc., 325 W. Huron St., Chicago 10, Illinois

Vice-Chairman — ELLIOTT MORRILL
Treasurer — EDWARD LARSON

Southeastern Section

Chairman
C. RUSSELL GILL
Southern Sizing Co., P. O. Box 167, Atlanta, Georgia

Secretary
S. JACK DAVIS
Callaway Mills, LaGrange, Georgia

Vice-Chairman — HOWARD M. WADDLE
Treasurer — ADAM FISHER, JR.

Western New England Section

Chairman
J. EDWARD LYNN
American Cyanamid Company, Stamford, Connecticut

Secretary
EDWARD A. MURRAY
Deering Milliken Research Trust, Stamford, Connecticut

Vice-Chairman — RAYMOND J. CAREY
Treasurer — ROBERT N. BROWNLEE

Pacific Coast Section

Chairman
FRANK P. BRENNAN
U. S. Testing Company, 766 S. Los Angeles St., Los Angeles 14, California

Secretary
H. A. DE MARAIS
General Dyestuff Corp., 37 Clementina St., San Francisco, California

Vice-Chairman — BENJAMIN O. RACE
Treasurer — SIDNEY SPRINGER

Hudson-Mohawk Section

Chairman
JACK EPELBERG
Cluett, Peabody & Co., 117th St. at 7th Ave., North Troy, New York

Secretary
WILLIAM A. NELSON
Ritter Chemical Company, Inc., 403 W. Main St., Amsterdam, New York

Vice-Chairman — DAVID O. HAMER, JR.
Treasurer — IRWIN J. SMITH

Student Chapters

LOWELL TEXTILE INSTITUTE
NORTH CAROLINA STATE COLLEGE
PHILADELPHIA TEXTILE INSTITUTE
NEW BEDFORD TEXTILE INSTITUTE
GEORGIA SCHOOL OF TECHNOLOGY
CLEMSON COLLEGE
BRADFORD DURFEE TECHNICAL INSTITUTE

ONE HUNDRED AND SIXTY-FIFTH COUNCIL MEETING

THE Council held its 165th meeting in the Hotel New Yorker, New York, N. Y., on Friday morning, January 28, 1949. Present were President Henry F. Herrmann, presiding; John N. Dalton and C. Norris Rabold, Vice Presidents; William R. Moorhouse, Treasurer; J. Robert Bonnar, Chairman of the Research Committee; William D. Appel, William H. Cady, Carl Z. Draves, Louis A. Olney and P. J. Wood, Past Presidents; Kenneth R. Fox and Frank J. O'Neil representing Northern New England; Arthur E. Hirst, Raymond W. Jacoby and Alden D. Nute representing Rhode Island; Winn W. Chase, Charles W. Dorn, Herman E. Hager, William A. Holst, Jr., and Herman E. Wilde representing New York; Walter F. Fancourt 3rd., Onslow B. Hager, M. H. Klein, Ernest E. Rettberg and Frederick V. Traut representing Philadelphia; John B. Neely and Douglas C. Newman representing Piedmont; S. Jack Davis and Walter M. Scott representing Southeast; Harold H. Taylor representing Western New England; Albert E. Herrmann, Jr., representing the Hudson-Mohawk Section; Kenneth H. Barnard of the Convention Committee; Miles A. Dahlen of the Technical Program Committee; Jack Epelberg of the Hudson-Mohawk Section; Edwin R. Laughlin of the Colour Index Committee; Paul J. Luck of the Publicity Committee; Leonard S. Little and Ernest H. Hart of the Corporate Membership Committee; Robert W. Philip of the Southeastern Section; Harold W. Stiegler, Research Director; and Harold C. Chapin, Secretary.

The Secretary's report of the 164th. Council meeting and financial report of January 17, and the Treasurer's report of January 18, were accepted. Henry F. Herrmann was reported elected President, and John N. Dalton and C. Norris Rabold Vice Presidents.

Committees were appointed or stand as follows:

Executive Committee on Research

J. R. Bonnar, *Chairman*

S. L. Hayes — H. F. Herrmann
W. D. Appel — M. A. Dahlen
P. Theel

Publicity

P. J. Luck, *Chairman*

G. H. Schuler, *Vice Chairman*

Others to be appointed by the Chairman, in consultation with local Sections.

Appropriations

W. R. Moorhouse, *Chairman*

L. A. Olney — P. J. Wood
H. C. Chapin — C. Z. Draves

Membership and Local Sections

J. N. Dalton, *Chairman*

H. C. Chapin — C. N. Rabold

Publications

L. A. Olney, *Chairman*

C. Z. Draves — R. W. Philip
P. J. Luck — H. C. Chapin
W. H. Cady — N. A. Johnson
H. F. Herrmann — G. H. Schuler

Corporate Membership

L. S. Little, *Chairman*

E. H. Hart, *Vice Chairman*

Others to be appointed by the Chairman in consultation with local Sections.

Constitution and Bylaws

H. C. Chapin, *Chairman*

C. Z. Draves — W. R. Moorhouse

Conventions

K. H. Barnard, *Chairman*

S. L. Hayes — D. C. Newman
B. C. Bond — E. J. Driscoll
G. O. Linberg — R. W. Philip
H. C. Chapin — W. F. Fancourt, 3rd
E. F. Smith

Technical Programs

A. W. Etchells, *Chairman*

S. Williams — S. J. Davis
R. W. Jacoby — F. Dannerth
K. H. Barnard — V. B. Holland
H. Boxser — H. E. Hager
M. A. Dahlen — R. B. Seymour

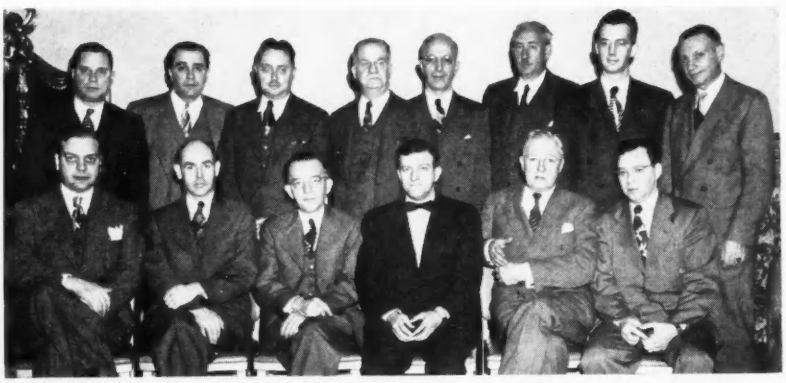
Intersectional Contest

P. J. Kennedy, *Chairman*

Others to be appointed by the Chairman, in consultation with local Sections.

Merchandise

H. F. Herrmann — H. C. Chapin
J. R. Bonnar — W. R. Moorhouse
H. W. Stiegler



NEW REPRESENTATIVES PRESENT AT THE COUNCIL MEETING ON JANUARY 28TH

Standing, left to right: **Albert E. Herrmann,** Councilor, H-M Section; **Ernest E. Rettberg,** Vice Chairman, Atlantic City Convention Committee; **Frederick V. Traut,** Councilor, PHIL Section; **Raymond W. Jacoby,** Councilor, RI Section; **M. H. Klein,** Councilor, PHIL Section; **John B. Neely,** Councilor, PIED Section; **Kenneth R. Fox,** Councilor, NNE Section; **Walter M. Scott,** Councilor SE Section.

Seated left to right: **S. Jack Davis,** Secretary, SE Section; **Onslow B. Hager,** Councilor, PHIL Section; **Herman E. Wilde,** Councilor, NY Section; **Frank J. O'Neil,** Chairman, NNE Section; **Herman E. Hager,** Councilor, NY Section; **Jack Epelberg,** Chairman, H-M Section.

Colour Index, General Committee

L. A. Olney, *Chairman*
E. R. Laughlin, *Secretary*
W. H. Cady, *Coordinator*

W. D. Appel	W. C. Bainbridge
R. E. Derby	F. R. Haigh
R. W. Powell	T. R. Smith
J. R. Bonnar	R. W. Jacoby
W. A. Holst, Jr.	W. von Bergen
B. M. Van Cleve	A. F. Clark
H. M. Chase	W. R. Moorhouse

J. L. Crist A. Morrison P. J. Wood

Colour Index, Steering Committee

W. H. Cady, *Chairman*

R. W. Jacoby	L. A. Olney
W. D. Appel	A. F. Clark
E. R. Laughlin	R. W. Powell
J. R. Bonnar	W. A. Holst, Jr.

Colour Index, Subcommittee on Classification and Numbering

W. H. Cady, *Chairman*

W. A. Holst, Jr.	J. R. Bonnar
W. C. Bainbridge	E. R. Laughlin
R. W. Jacoby	A. F. Clark

Colour Index, Subcommittee on Fastness

W. H. Cady, *Chairman*

C. A. Seibert	A. K. Gyzander
H. Christison	D. P. Knowland
L. Fusser	R. W. Powell

Colour Index, Subcommittee on Properties Other Than Fastness

W. H. Cady, *Chairman*

F. Dexter	W. A. Holst, Jr.
E. C. Hansen	C. A. Sylvester

Colour Index, Subcommittee on Coordination of Data

G. H. Schuler, *Chairman*

D. P. Knowland	A. L. Peiker
R. C. Allison	G. E. Goheen
E. D. Lind	C. H. A. Schmitt
L. Fusser	W. A. Holst, Jr.

M. G. Stern

Representative on Inter-Society Council for Textile Research

C. Z. Draves W. A. Holst, Jr., *Alternate*

President's Advisory Committee

L. S. Little, *Chairman*

E. H. Killheffer	C. N. Rabold
W. D. Appel	C. Z. Draves
W. R. Moorhouse	T. R. Smith
H. C. Chapin	J. N. Dalton

P. J. Wood

Reporting for the Research Committee, Mr. Bonnar stated that Sectional advisory research committees were to be appointed in the three new Sections. Two Sections have turned in literature surveys for publication, and one on Continuous Bleaching is about ready. Eleven of our standard methods had recently been sub-

COUNCIL MEETING AT HOTEL NEW YORKER, NEW YORK CITY, JANUARY 28TH

Standing, left to right: **Kenneth R. Fox,** Councilor, NNE Section; **Harold H. Taylor,** Councilor, WNE Section; **Arthur E. Hirst,** representing RI Section; **P. J. Wood,** Past President; **M. H. Klein,** Councilor, PHIL Section; **Onslow B. Hager,** Councilor, PHIL Section; **Albert E. Herrmann,** Councilor, H-M Section; **Ernest E. Rettberg,** Vice Chairman, Atlantic City Convention Committee; **Winn W. Chase,** Councilor, NY Section; **Frederick V. Traut,** Councilor, PHIL Section; **John B. Neely,** Councilor, PIED Section; **Herman E. Wilde,** Councilor, NY Section; **Walter F. Fancourt, 3rd,** Councilor, PHIL Section; **William A. Holst, Jr.,** Councilor, NY Section; **Jack Epelberg,** Chairman H-M Section; **William D. Appel,** Past President; **Raymond W. Jacoby,** Councilor, RI Section; **Frank J. O'Neil,** Chairman, NNE Section; **Herman E. Hager,** Councilor, NY Section; **Alden D. Nute,** Representing RI Section; **Harold W. Stiegler,** Director of Research; **Robert W. Philip,** Representing SE Section; **Paul J. Luck,** Chairman, Publicity Committee.

Seated, left to right: **Charles W. Dorn,** Chairman and Councilor, NY Section; **Walter M. Scott,** Councilor, SE Section; **John N. Dalton,** Vice President; **C. Norris Rabold,** Vice President; **Harold C. Chapin,** Secretary; **J. Robert Bonnar,** Chairman, Research Committee and Chairman, Executive Committee on Research; **Henry F. Herrmann,** President; **Carl Z. Draves,** Past President; **Louis A. Olney,** President Emeritus; **William H. Cady,** Past President; **William R. Moorhouse,** Treasurer; **S. Jack Davis,** Representing SE Section.

mitted to the American Standards Association for adoption as American Standards, and all which have been so adopted will be thus designated in the 1949 Year Book. A new Committee on Nomenclature and Classification had been appointed, with Dr. Draves as Chairman. Under consideration was whether the Association should adopt one or more of the existing sources of soiled cloth for tests, or devise its own standards. It was recommended that for adoption of Tentative Standard Methods authority rest with the Research Committee, but for Official Standard Methods with the Council. The Canadian Association of Textile Chemists and Colorists, contemplating standards of its own, had been offered our cooperation.

Dr. Olney stated that the *Textile Colorist and Converter*, recently incorporated with the *American Dyestuff Reporter*, would be reduced to nominal space in the publication after obligations to subscribers and advertisers had been fulfilled. For the Publications Committee he reported the 1949 *Year Book* nearly ready for publication, and the new Analytical Methods for a Textile Laboratory virtually ready. To cover cost of publication of the latter, the Council, with approval of the Appropriations Committee, increased its original appropriation of $3000. to a total of $5000. Regarding the second monograph, on Vat Dyes, Mr. Jacoby said the committee engaged in the work had decided on contents, to include all uses of vat colors, even outside textiles; and had already assigned chapters to the workers. Costs and business arrangements for the new *Colour Index* were discussed by Mr. Cady and Dr. Laughlin.

As last year, it was voted that $25. average per meeting be allowed each Section for travelling expenses of speakers, to be paid from the general treasury direct to the speakers, in accordance with vouchers signed by Section secretaries and mailed to the Secretary of the Association. This is in addition to reimbursements to the Sections themselves for expenses, as provided in the Bylaws.

Professor Lindsay's report for the Committee on Student Awards was presented by P. J. Wood. Accepting the report, the Council voted that an award be made each year in each institution having a Student Chapter of the Association, to that member of the graduating class judged by the textile chemistry department of the institution to have done the best work in the field of textile chemistry during his college career; the award to consist of Junior membership in the Association for the dues year following graduation, and a book awarded at the time and place of other awards and honors in the institution. In this book, and the *Year Book* going with the membership, are to be inserted book plates designed by Mr. Wood, bearing the seal of the Association.

Reporting on the Augusta convention, Mr. Newman said there were 1035 registered. For the Publicity Committee Mr. Luck asked that copies of papers for the next convention be made available in advance. Mr. Fancourt, reporting Philadelphia Section plans for Atlantic City on Oct. 13 to 15, stated that there would be ample bedrooms and facilities for banquet and exhibits. Dr. Scott suggested that smaller Sections might offer better competition in the Intersectional Contest were they permitted to enter in but alternate years. There was discussion of possible improvements in judging. Mr. Barnard advocated a regular employee of the Association to assist in convention arrangements. He also stated that a meeting of the Council, and of the Research Committee, in Canada would be welcomed; and the Council voted a resolution approving such.

According to Mr. Dorn, the National Retail Dry Goods Association contemplated the preparation of a pamphlet on textiles for buyers. He suggested that we send representatives to a meeting to discuss cooperation on this and other projects, and the Council authorized the President to appoint a committee to consider this.

For the Committee on Membership and Local Sections Mr. Dalton recommended that the territory of the new Hudson-Mohawk Section be the Mohawk River valley and New York State to northward and west to Buffalo; together with the Hudson River valley as far south as Kingston.

March 25, and June 9, a Thursday, were the dates set for the next two Council meetings, in New York.

Elected to Corporate membership were Burlington Mills Corporation, New York, the Carey Salt Co., Chemical Products Corporation, Colonial Piece Dye Works, Inc., Fulton Bag and Cotton Mills, Georgia Twine and Cordage Co., Mt. Vernon-Woodberry Mills, Inc., Myles Salt Co., Phoenix Dye Works, Proctor Chemical Co., Inc., Riverside Mills, Washougal Mills, and Weehawken Dye Works, Inc. Each of the following was elected to the class of membership specified, as of thirty days from publication of application, provided no objection be received meanwhile by the Secretary.

Senior

C. S. Adams	H. O. Bennett
J. C. Aitchison	E. G. Bernier
W. E. Anders	H. H. Bestehorn
C. A. Anderson	E. D. Bolinger
E. C. Anderson	E. A. W. Boyce
N. C. Armitage	J. C. Boyles
I. L. Arthur	T. A. Bramfitt
L. Auer	J. J. Bramhall, Jr.
J. W. Auman	W. H. Brinkley
G. L. Battye	O. H. Browne
P. W. Benn	H. L. Brundage

SECRETARY'S FINANCIAL REPORT—JANUARY 17, 1949

	Applications	*Dues, Regular & Reinstate*	*Corporate & Sustaining*	*Miscellaneous*	*Totals*
Received and transmitted to Treasurer,					
August 1 to October 16, 1948	$ 894.00	$3,958.00	$ 670.00	$4,144.10	$9,666.10
October 16, 1948 to January 17, 1949	2,050.00	25,936.00	30,992.50	6,468.04	65,446.54
Totals in fiscal year to date	2,944.00	29,894.00	31,662.50	10,612.14	75,112.64
Leaving deposited by Treasurer with Secretary,					9,643.45
Miscellaneous items,					
Dividends				$ 807.90	
Augusta convention registrations, net after local expenses				620.30	
Quartermaster contract				364.54	
Reporters and reprints				7.40	
Year Books				2,498.85	
Analytical Methods				4.00	
Crockmeters				771.00	
Crock cloth				213.75	
Multifiber cloth, royalties				68.37	
Moth cloth				77.00	
Water test apparatus				183.25	
Dyed standards				127.40	
Knitted tubing				110.25	
Gas fading units				65.50	
Buttons				13.00	
Color transfer charts				60.00	
Colour Index				480.00	
				6,472.51	
Less Bank Charges				4.47	
				$6,468.04	

J. P. Cadgene
F. G. Calkin
W. B. Calvert
C. H. Carter
N. S. Cassel
G. D. Causey
C. F. Chace
A. Challes
A. M. Choman
W. Christ
J. D. Clary
G. H. Clough
W. B. Coleman
J. B. Cook, Jr.
F. X. Cooney
E. V. Correli
A. J. Costa
H. M. Cotton
R. J. Cowles
J. F. Cowley
F. F. Darbary
A. T. Das
F. K. Davis
J. K. Davis
D. G. Deddo
L. Delk
G. A. Dickson
J. H. Dillon
H. A. Dimick
G. L. Dorough
E. S. Dougans
M. R. Espeland
B. L. Estes
A. H. Fearn
J. E. Feeney
B. B. Fernald, Jr.
J. D. Fortenberry
L. J. Frank
A. Gallo
R. K. Gallup
W. Garnett
A. R. Garri
L. Goldberg
J. T. Goosetrey
C. C. Gordon
A. F. Gortvai
J. M. Griffing
J. G. Gurr
B. Gutmann
L. Hagan
O. J. Haller
F. H. Haney
O. H. Hansen
E. L. Hansen
R. P. Hardeman
R. E. Hardesty
J. V. Harrington
S. C. Harris
F. W. Hausman
F. R. Healey
C. K. Henry
T. P. Higgins
E. W. Hilker
D. S. Hirtle
S. S. Hockridge
T. C. Holst
W. H. Horne
F. L. Howell, Jr.
R. E. Hudson, Jr.
W. Hulme
S. Humlen
E. Y. Hyde, Jr.
F. Ingham
W. Jacobson
A. C. Jaegers
H. A. Jasmine
H. F. Johnson
H. H. Johnson
N. S. Johnson
W. W. A. Johnson
J. E. Jones
F. Jordan
R. L. Kern
J. V. Kiernan
D. W. Kimsey
W. Kitaj
M. R. Kleeman
W. M. Kline
W. D. Krafchuk
P. J. Kraft, Jr.
J. F. Krawiec
P. L. Lavoie
H. J. Leavitt
D. J. Lehmicke
F. F. Lester
J. W. Lindley
J. M. Loebel
J. Lord
J. F. Mackell
M. Mackin
J. A. Manley
A. R. Martin
M. A. Mazer
H. F. McKay
C. M. McKeown
P. M. McLarty
G. R. Meier
C. D. Metzger
A. H. Milask
L. M. Miller
S. R. Miller
R. P. Monnier
E. F. Morey
R. F. Morris
L. G. Mount
R. I. Moyer
E. M. Murphy
F. A. Murphy
J. J. Murphy
G. F. Nadeau
J. Nehrings
C. F. Nelson, Jr.
C. W. Nichols
W. E. Noble
I. E. Oesterreich
C. R. Pacifico
W. D. Paine
E. V. Painter
R. Parrillo
M. A. Pavlovich
J. D. Pearce
C. B. Peake
F. J. Peterson
C. W. Pfeifer
R. W. Pinault
E. J. Plaud
R. Prezioso
B. F. Pulsifer
W. A. Qualman, Jr.
R. J. Quinn
P. H. Rabe
R. C. Rau
J. W. Rodway
E. Rosenblum
G. M. Schroder
F. C. Schultze
E. Scruggs
R. D. Seed
R. B. Seth
F. E. Sevensky
J. C. Shaw
B. J. Shepard
W. E. Shinn
S. Somay
T. B. Spence
J. P. Stanley
F. Steinberger
E. J. Stephen
E. R. Stewart
R. A. Sugerman
C. Thompson
J. W. Thompson
A. G. Tompson
W. R. Tornquist
D. Trasatti
T. H. Trimble
T. Tu
K. Turner
E. J. Tyrrell
A. H. van der Heide
F. C. Van Ess
C. W. Van Zile
G. A. Wallace
L. Waller
C. J. Weidmann
J. R. Wells
E. Wilkinson
J. U. Wilson
M. Winkler
P. Wupperfeld
R. L. Young, Jr.
A. W. Zinn

Junior

M. A. Adams
J. P. Barker
G. Bayer
R. A. Behrmann
R. E. Bound
W. E. Bradley
S. J. Clark, Jr.
J. J. Daley
W. F. Danner
H. K. Ezell, Jr.
H. W. Fritz
J. G. Honig
R. A. Jedeikin
F. H. Kelley
J. T. Lindley
W. R. Louv
S. D. MacKenzie
P. Madeiros, Jr.
W. Marcellino
W. Martin, Jr.
J. A. McGuigan
R. A. Moren
J .R. Motha
L. I. Mowrey
V. E. Neimeyer
Eloy Pazos
A. A. Poitras
F. K. Quigley, Jr.
R. H. Quiri
R. R. Rossi
R. G. Schenck
R. E. Seaman
L. A. Shive
D. W. Snyder
C. A. Thompson
E. E. Weeden
I. Wexler

Associate

J. B. Allen
V. K. Babayan
J. J. Blake
H. Boxer
F. L. Dennett
I. S. Entwisle
J. L. Fancourt
M. T. Fleming
E. A. Freeman, Jr.
E. D. Haller
L. C. Harmon, Jr.
M. O. Harris
J. L. Henderson
A. Hering
A. R. Hogue
R. W. Jones
R. Kithil
P. A. Leiner
C. H. Lindsey
J. Marcolla
B. B. Olson
R. E. Pemrick
R. Pickin
R. J. Rendleman
H. M. Rogers, Jr.
A. I. Silver
F. J. Solon, Jr.
J. K. Sumner
B. L. Taylor
M. van Leer

Student

D. R. Aichner
A. B. Almeida
D. C. Anderson
S. L. Arky
A. Armenante
T. Arno
E. H. Aspinwall, Jr.
E. C. Batkin
A. P. Belanger
M. H. Bernstein
G. K. Blanton
R. H. Boggs
W. H. Boring
B. J. Bornong
W. H. Boyd, Jr.
M. Brabant
B. H. Brinkley, Jr.
D. I. Brook
W. J. Brooks
H. S. Buck
A. F. Cacella
R. Carbonaro
R. A. Carnevale
D. M. Cates
V. S. Chesler
L. T. Cleary
L. G. Coleman
T. C. Cortese
G. T. Costello
J. H. Cox
J. J. Dannenberg
W. P. Dean, Jr.
D. C. Edzwald
W. M. Elam
J. D. Ellington, Jr.
J. W. Ellington
H. F. Elsom
J. H. Emerson
R. D. Feitlowitz
H. D. Fine
R. W. Foltz
R. H. Freeman
N. Friedman
J. E. Garrett
J. R. Geiger
W. F. Gerrow, Jr.
C. F. Getsinger, Jr.
J. R. Godet
H. J. Gold
B. H. Goldstein
G. M. Goldstein
J. M. Goldston
S. Greaves
P. E. Gregoriou
J. C. Grifo
M. Havinovski
R. E. Halligan
G. G. Hallman
H. B. Hatfield, Jr.
E. S. Hobson
J. H. Hoffman
W. F. Hoffman, Jr.
F. M. Hornyak
K. A. Jenkins
H. L. Jones
G. A. Jordanides
B. M. Keasler
W. H. Keasler
J. L. Keenan
R. B. Kerce
E. J. Khoury
A. Kin
J. J. Kneen
B. L. Komins
I. D. Kreindel
S. C. D. Kuo
L. E. Labrecque
L. H. Lapointe
F. C. Laspe
E. R. Lavagnino
T. P. Lee
H. R. Lester, Jr.
T. D. Lewis, Jr.
H. L. Loveless
G. M. Mackie
J. E. Marcotte
W. L. Mathias
J. T. McDonald
H. N. McGuire
T. J. McKone
V. J. McKone
J. McLuckie
W. T. Meinert
A. Mercer, Jr.
W. T. Milloway
A. E. Mitchell
J. B. Monego
T. W. Moore
R. E. Morrison
D. A. Nanda
J. L. Neal
R. A. Olney
J. S. Panto
W. B. Patten
R. V. Phelan
L. L. Place
E. G. Reep, Jr.
E. L. Reid
H. M. Reynolds, Jr
C. P. Roberts
R. M. Robillard
C. J. Rodgers, Jr.
A. Rothenberg
W. T. Rutledge, Jr.
M. R. Safir
Y. J. Sane
Z. A. Sawwaf
G. H. Schnabel
P. M. Segal, Jr.
J. A. Shaughnessy
C. R. Sheehan
C. E. Sheffield
A. J. Slowe
J. H. Smith
G. W. Spicer
M. Spielman
M. E. Spring
W. M. Staub
J. Steinberg
R. R. Stewart, Jr.
R. W. Sumers
W. F. Taylor
P. H. Terry
G. N. Thompson, Jr.
E. C. Thornton
H. M. Todd, Jr.
M. C. Tosone
D. M. Veal, Jr.
R. C. Wagner
N. B. Weinstein
S. A. Weissman
S. J. H. Weldon

D. Wiener
P. A. Woerner
S. Wolin
F. J. Wood
M. Yankapoulos
H. G. Ziemba

Transferred from other classifications to Senior Membership were:

W. R. Adams
O. J. Agricola
G. Alperin
W. V. Bagley
K. C. Busby, Jr.
M. P. Coulman
M. Crowther
A. E. Culp, Jr.
B. S. Daniel
M. P. Decker, Jr.
P. DeMallie
D. B. Finn
R. L. Gill
W. A. Hoffman
P. J. Howard
G. A. Lathrop
V. D. Lyon
J. B. Masaschi
J. W. Merrill
A. S. Messer
Z. S. Messinger
G. H. Momeier, Jr.
T. P. Moore, Jr.
A. J. Moreau
J. M. Nesius
G. F. Richardson
C. R. Sandner
B. G. Skalkeas
R. E. Stevenson
J. A. C. A. Thijs
L. M. Vavala
F. L. Ward
F. B. Wobecky

Respectfully submitted,
H. C. Chapin,
Secretary.

—♦ ♦—

Piedmont Section to Meet April 2nd

THE Spring Meeting of the Piedmont Section will be held in Winston-Salem, N. C. at the Robert E. Lee Hotel, April 2, 1949.

J. C. Whitt of the Century Division, Standard Hosiery Mills, Inc., Burlington, N. C. is general chairman in charge of the arrangements for this meeting.

Two technical sessions will be held Saturday afternoon, April 2, at 3:00 P.M. Charles A. Seibert of the E. I. Dupont de Nemours Co., Inc., Wilmington, Delaware will discuss before the cotton group, "What is Satisfactory Washfastness and How May it be Described and Measured." Mr. Seibert is national chairman of the Washfastness Committee. John B. Neely, Burlington Mills Corp., Burlington, N. C., a former chairman of the Piedmont Section, will lead the discussion following Mr. Seibert's address.

The Hosiery Group will hear Albert J. Crumley, Supt. of the Bryan Full Fashion Mills of Chattanooga, Tennessee discuss "Hosiery Colors and Dyeing." The discussion which will follow Mr. Crumley's address will be lead by Henry Dixon of the May McEwen Kaiser Div. of the Burlington Mills Corp., Burlington, N. C. Mr. Dixon is a former chairman of the Piedmont Section.

W. H. Neal, Senior Vice President of the Wachovia Bank & Trust Company, Winston-Salem, N. C., will address the members after the banquet which will be served at 7:00 P.M. He will have for his subject, "Where Do We Go From Here?" Entertainment, following the banquet, will be furnished by the Winston-Salem Lions Club.

R. Hobart Souther, Cone Finishing Company, Greensboro, N. C., Treasurer of the Piedmont Section, requests that reservations for the banquet be sent to him prior to April 2 to insure adequate banquet accommodations. Banquet reservations $4.50 per plate.

—♦ ♦—

Membership Applications

ASSOCIATE

Margaret O. Harris—Assoc. Prof. of Textiles & Clothing, Univ. of Calif. at Los Angeles.

Ralph W. Jones—Chief, Phila. News Bureau, Daily News Record, Philadelphia, Pa.

Richard Kithil—Vice President, The Carwin Co., North Haven, Conn.

Clarice H. Lindsey—Teacher, University of Calif., Los Angeles, Calif.

Ronald Pickin—Textile Colorist, Messrs. Brotherton & Co., Ltd., Birkenhead, England.

STUDENT

Ernest J. Khoury—Lowell Textile Institute—Sponsor: E. E. Fickett.

Burton L. Komins—Lowell Textile Institute—Sponsor: E. E. Fickett.

Mario C. Tosone—Lowell Textile Institute. Sponsor: E. E. Fickett.

Leonard G. Coleman—Philadelphia Textile Institute. Sponsor: P. Theel.

Thomas C. Cortese—Philadelphia Textile Institute. Sponsor: P. Theel.

Thomas P. Lee—Philadelphia Textile Institute. Sponsor: P. Theel.

Joshua B. Monego—Philadelphia Textile Institute. Sponsor: P. Theel.

Americo B. Almeida—Bradford Durfee Technical Institute. Sponsor: J. Watters.

Alvin P. Belanger—Bradford Durfee Technical Institute. Sponsor: J. Watters.

Aung Kin—Bradford Durfee Technical Institute. Sponsor: J. Watters.

Edward R. Lavagnino—Bradford Durfee Technical Institute. Sponsor: J. Watters.

George M. Mackie—Bradford Durfee Technical Institute. Sponsor: J. Watters.

Roger M. Robillard—Bradford Durfee Technical Institute. Sponsor: J. Watters.

George H. Schnabel—Bradford Durfee Technical Institute. Sponsor: J. Watters.

Jack Steinberg—Bradford Durfee Technical Institute. Sponsor: J. Watters.

Russell C. Wagner—Bradford Durfee Technical Institute. Sponsor: J. Watters.

Norman B. Weinstein—Bradford Durfee Technical Institute. Sponsor: J. Watters.

Frederick J. Wood—Bradford Durfee Technical Institute. Sponsor: J. Watters.

Menelaos Yankopoulos—Bradford Durfee Technical Institute. Sponsor: J. Watters.

Richard Carbonaro—New Bedford Textile Institute. Sponsor: F. Tripp.

Leonard L. Place—New Bedford Textile Institute. Sponsor: F. Tripp.

Donald R. Aichner—Institute of Textile Technology. Sponsor: G. H. Coleman.

Bernard J. Bornong—Institute of Textile Technology. Sponsor: G. H. Coleman.

Warren T. Milloway—Institute of Textile Institute. Sponsor: G. H. Coleman.

TRANSFER TO SENIOR

Milton Crowther, Zane S. Messinger, J. A. C. A. Thijs, Frederic L. Ward.

CORPORATE

Burlington Mills Corp. of New York, New York, N. Y.

Phoenix Dye Works, 1963 Southport Avenue, Chicago 14, Ill.

Weehawken Dye Works, Inc., 223-231 Hackensack Plank Rd., Weehawken, N. J.

SENIOR

Edward G. Bernier—Second Hand, Marland Mills, M. T. Stevens & Sons Co., Andover, Mass. Sponsors: E. M. Lynch, Jr., J. E. Cummings.

James J. Bramhall, Jr.—Supt. Dyeing & Finishing, Holly Knit, Inc., Mt. Holly, N. C. Sponsors: T. H. Hart, J. W. Barton.

Francis X. Cooney—Divisional Supt., Cranston Print Works Co., Cranston, R. I. Sponsors: H. J. Cranston, E. W. Lawrence.

John F. Cowley—Mgr., Testing Lab., T. B. Lee Co., Inc., 101 W. 31st St., New York, N. Y. Sponsors: C. W. Dorn, F. Stutz.

Elliot S. Dougans—Dyer, Thomas Dawson & Co., Inc., Philadelphia, Pa. Sponsors: D. O. Hamer, Jr., J. E. Shepherd.

Arturo R. Garri—Mgr., Dyestuffs Dept., Mauricio Hochschild y Cia Ltda., Santiago, Chile. Sponsors: C. Z. Draves, H. Luttringhaus.

John V. Harrington—Chemist, Nopco Chemical Co., Harrison, N. J. Sponsors: H. C. Meegan, J. Zaparanick.

William H. Horne—Chemist, Deering Milliken Research Trust, Stamford, Conn. Sponsors: E. A. Murray, O. M. Stamm.

William Hulme—Head Dyer, Textile Weavers, Ltd., Grandmere, Que., Canada. Sponsors: C. H. A. Schmitt, J. C. Walker.

Frederick Ingham—Asst. Colorist, Cranston Print Works Co., Cranston, R. I. Sponsors: E. W. Lawrence, H. J. Cranston.

Maxwell R. Kleeman—Tech. Repres., Carbide & Carbon Chemicals Corp., Boston, Mass. Sponsors: L. Shapiro, B. L. Rhodes.

Philip J. Kraft, Jr.—Technician, Sandoz Chemical Works, Inc., Boston, Mass. Sponsors: J. E. Ormiston, Jr., A. J. Carbone.

Joseph F. Krawiec—Instructor, Textile Chemistry, The Pennsylvania State College, State College, Pa. Sponsors: D. S. Lyle, S. Davison.

Joseph F. Mackell—Vice Pres., R. B. Dutt Co., Philadelphia, Pa. Sponsors: E. R. Beigbeder, J. W. Barton.

Michael Mackin—Dyer Foreman, American Velvet Co., Stonington, Conn. Sponsors: G. H. Klingberg, J. E. Lawton.

Paul M. McLarty—Overseer Finish. & Sanforizing, Thomaston Mills, Thomaston, Ga. Sponsors: W. F. Crayton, A. B. Owens.

Earl F. Morey—Boss Dyer, Sanco Piece Dye Works, Phillipsburg, N. J. Sponsors: W. O. Neeb, S. Dougherty.

James D. Pearce—Mgr. & Vice Pres., Horrocks & Bros., Philadelphia, Pa. Sponsors: E. R. Beigbeder, M. Stead, Jr.

Francis J. Peterson—Salesman, Ciba Co., Inc., New York, N. Y. Sponsors: W. H. Espelin, T. Hirsch.

George M. Schroder—Research Chemist, Henry H. Frede & Co., Inc., Chattanooga, Tenn. Sponsors: A. H. Gaede, H. H. Frede.

Robert B. Seth—Salesman, Watson Park Co., Boston, Mass. Sponsors: K. B. Park, H. R. Wilkinson.

Julian C. Shaw—Research Engr., The American Laundry Machinery Co., Norwood, Ohio. Sponsors: T. Waffenschmidt, E. W. Camp.

Thomas B. Spence—Salesman, American Cyanamid Co., Philadelphia, Pa. Sponsors: J. Dixon, R. H. Drukker.

Fred C. Van Ess—Head Dyer, Hat Coloring, Danbury Hat Corp., Danbury, Conn. Sponsors: W. Ferrazano, R. F. Holoch.

JUNIOR

James A. McGuigan—Lab. Asst., Globe Dye Works Co., Philadelphia 24, Pa. Sponsors: F. V. Traut, C. Monego.

Robert A. Moren—Dyer, Bradford Dyeing Assn., Bradford, R. I. Sponsors: G. Dobson, G. J. Curry.

ASSOCIATE

Firth L. Dennett—Product Engg. Labs., Dow Corning Corp., Midland, Mich.

James L. Henderson—Salesman, J. M. Tull Metal & Supply Co., Atlanta, Ga.

Andre R. Hogue—Chief Chemist, B. B. Chemical Co. of Canada, Ltd., Montreal, Que.

F. J. Solon, Jr.—Gen. Mgr., Special Service Div., Glass Fibers, Inc., Waterville, Ohio.

STUDENT

Walton H. Boring—Georgia Institute of Technology. Sponsor: C. A. Jones.

Ralph B. Kerce—Georgia Institute of Technology. Sponsor: C. A. Jones.

Harold J. Gold—Bradford Durfee Technical Inst. Sponsor: J. Watters.

Leo E. Labrecque—Lowell Textile Inst., Lowell, Mass. Sponsor: E. E. Fickett.

TRANSFER TO SENIOR

Louis M. Vavala.

—♦ ♦—

Report, L.T.I. Student Chapter

AT its regular monthly meeting on February 9, 1949, the Lowell Textile Institute Student Chapter considered affiliation with the newly formed Intercollegiate Chemical Society, composed of the student chemical societies of colleges in the vicinity of Boston. This Society will hold its first annual banquet at the Puritan Hotel in Boston on March 8th.

At a seminar on January 27th, M. J. Scott of the Monsanto Chemical Co., Merrimack Division, spoke on "Resins."

Respectfully submitted,
JOAN L. GREGG
Secretary

CALENDAR

WESTERN NEW ENGLAND SECTION
Meetings: April 8, May 20.

NEW YORK SECTION
Meetings: April 1, May 6.
Outing: June 17.

PHILADELPHIA SECTION
Meetings: April 22, May 20, September 16, November 11 (Kugler's, Philadelphia).
Outing: June 10.

PIEDMONT SECTION
Meetings: April 2 (Robert E. Lee Hotel, Winston-Salem, N. C.), June 24, 25, 26 (Ocean Forest Hotel, Myrtle Beach, S. C.), November 5 (Charlotte Hotel, Charlotte, N. C.)

HUDSON-MOHAWK SECTION
Meetings: May 20, September 16, November 18.
Outing: June 17.

PACIFIC COAST SECTION
Meetings: May 13 (Los Angeles); May 17 (Portland).

RHODE ISLAND SECTION
Meeting: March 25 (Johnson's Grill, Providence)

SOUTHEASTERN SECTION
Meeting: April 29 (Ralston Hotel), Columbus, Ga.).

COUNCIL
Meetings: March 25 (Hotel New Yorker, New York), June 9, Sept. 9, Dec. 9.

RESEARCH COMMITTEE
Meetings: March 25 (Hotel New Yorker, New York), June 9, Sept. 9, Dec. 9.

NATIONAL CONVENTIONS
1949: October 13 to 15, Chalfonte-Haddon Hall, Atlantic City.
1950: October 19 to 21, Statler, Boston.
1951: October 18 to 20, Statler, New York.

EMPLOYMENT REGISTER

This column is open for four insertions per year, per member, without charge. Blanks can be obtained from, and filed with, the Secretary of the Association.

49-3
Education: Textile High School.
Experience: U. S. Army, clerk, one year textile colorist.
Age 24; married; reference.
2-7, 2-21, 3-7, 3-21

49-4
Education: Ph.D., organic chemistry; member Phi Beta Kappa, Sigma Xi.
Experience: Supervision of synthesis, and measurement of properties, of detergents and textile auxiliaries.
Age 39; married, happily employed but nearing end of research project; position in northern U. S. desired.
3-7, 3-21, 4-4, 4-18

49-5
Education: Lowell Textile Institute.
Experience: Textile Chemist and Quality Control Supervisor; Pilot, U. S. Navy Airbranch.
Age 32; married; references; position as Chief Chemist or Quality Control Director desired. 3-7, 3-21, 4-4, 4-18

49-6
Education: Three years college chemistry.
Experience: Chemist and Supt. of Dyeing, 25 years practical experience on woolens, rayons, nylons, silk, etc.
Age 50; married; references; will work anywhere.
3-21, 4-4, 4-18, 5-2

49-7
Education: Clemson College; expecting B. S. in Textile Chemistry, June, 1949.
Experience: U. S. Army and three years as bookkeeper.
Age 26; unmarried but with one dependent; South preferred, but North acceptable.
3-21, 4-4, 4-18, 5-2

—♦ ♦—

Report, Hudson-Mohawk Section

THE second official meeting of the Hudson-Mohawk Section was held at Jack's Restaurant, Albany, N. Y. on Friday, January 21, 1949. Dr. Alton A. Cook, Technical Director, Arkansas Company, Newark, N. J. presented a paper entitled "Function of a Laboratory in the Evaluation of Textile Finishes." An active discussion period followed.

Sixty-five members and guests were present at this meeting. It was agreed to hold the March 18th meeting in Utica, New York, in as much as the subject would be applicable especially to the knitting trade.

Respectfully submitted,
WILLIAM A. NELSON
Secretary

Joint Meeting, NNE and LTI Sections—

PHOTOGRAPHIC AIDS TO THE TEXTILE INDUSTRY*

MELVIN SIEGEL

Now Plant Manager, Jean Ribbon Mills, Inc., Paterson, N. J.

PHOTOGRAPHY had its beginning in the sixteenth century, with the observation that various silver compounds are sensitive to light. Other discoveries furthered its progress, but it was not until 1839, with the solution of the problem of "fixing", that pictures remained as taken, without destruction by the very light which had created them. Other discoveries and inventions followed, until today, with improved lenses, cameras, emulsions and processing techniques, one can hardly realize that this is a new science but a trifle over a century old.

With each development, scientists have busied themselves finding useful applications. In every field of science, and in every industry, photography has provided a tool for observing or recording phenomena. This is true in the textile industry, and here we shall cite some of the more outstanding and dramatic examples of how photography has proved an aid to further developments.

Records of all Kinds

When one mentions photography, he instantly thinks of records. Photography, through photostating and microfilming, offers a rapid and convenient means of duplicating and filing all kinds of records.

Many concerns find it more economical to photograph new developments for patent purposes, than to have draftsmen busy themselves for hours making drawings. In new type installations or improvements on existing machinery, photography saves hours of work and a great deal of money. Some of the larger mills, which have developed new machinery and wish to have their branch mills make these installations, have found that by photographing new apparatus in various stages of assembly, they can simplify the task of erecting machinery in the branch mills.

One mill makes it general procedure to take pictures of sliver diagrams of all lots of raw stock, at unity magnification. Through these, there is always available a record of the distribution of fibers of different lengths, and hence the percentage of different lengths. One cannot file this staple array because of its delicate nature, but finds the photograph a convenient substitute.

There have been cases where wool fabrics have not dyed as they should, and microscopic examination has shown bacterial damage to the fibers. A photomicrograph could be shown to fix responsibility, as it would be inconvenient to have all concerned peer into a microscope. Similarly, mildew damage can be recorded, and a streak in cloth can be traced to damaged or crimped yarn in the fabric. Photographs such as these are useful for records and reports.

The Draper Corporation has prepared a series of lantern slides as training aids for fixers and other mill personnel which are loaned to mills for use in classes. This visual form of education was developed to a great extent by the Signal Corps during the past war, and in time should have more applications in the textile industry.

Krook and Fox *(5)* made a study of the tongue-tear test in 1945, as part of a project for the Army Quartermaster General. They found, using photographs as means of analysis, that the mechanism of failure in a tongue-tear test is as follows: On application of force to the fabric in the testing machine, yarns held longitudinally between the jaws stretch and lose crimp, then start slipping across the transverse yarns to form a V-shaped opening in which there are no longitudinal yarns. As the load increases, the longitudinal yarns continue to slip and crowd together, increasing the size of the V-shaped opening. They then form a large number of fractional points of contact in a small area of fabric. As the number of these contact points builds up, it becomes more difficult for slippage to occur, and the load is progressively transferred to the transverse yarns, which are held in tension in the V-shaped "pseudo jaw." As the load builds up further, some of the transverse yarns fail once more, and again yarns slip by each other to form a new "pseudo jaw"; so on, in a cycle, until failure extends over the length tested. Thus failure of the yarns in a tongue-tear test occurs while the yarns are at an angle to the line of action of the jaws. Figure 1 illustrates this V-shaped opening while the sample is under load. Photography showed the mechanism of failure.

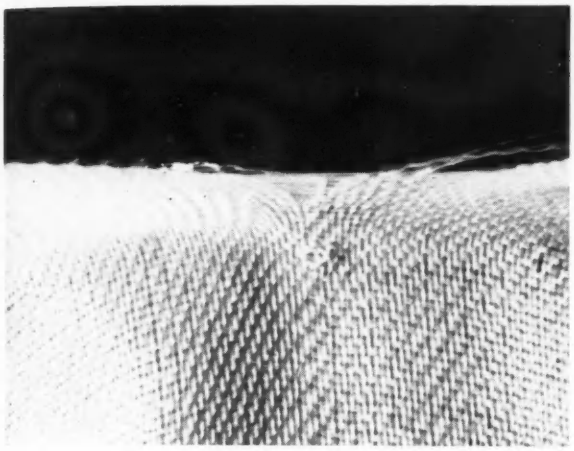
High-Speed Motion Picture Photography

In high-speed motion pictures one really has a time microscope, as time magnification is the result. In a still camera with an ultra-speed flash unit, exposures in the order 1/100,000 of a second are achieved. Dr. Harold E. Edgerton of the Massachusetts Institute of Technology pioneered in this type of work, both in still stroboscopic photography and in high-speed motion picture photography. With single exposure still pictures, a photograph of a mechanism under study may be had at any instant. High-speed motion pictures offer means of analyzing a complete mechanical cycle.

A mechanical cycle may be so rapid as to present impressions visually incorrect. Recorded on film, they may be studied and interpreted correctly. Both still and the motion picture have their applications, and we shall treat them separately.

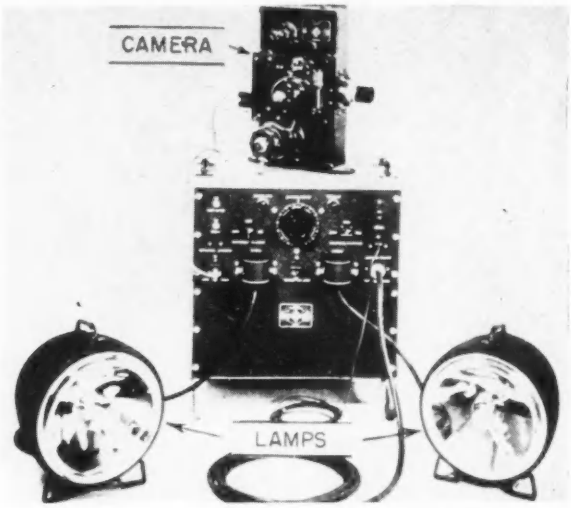
Although popularly known as "slow motion," the camera which takes "slow motion" is in reality an ultra-speed device. One might think that he need but speed up the camera to take the pictures. Inherent brittleness of film, however, sets a limit to speeding up the conventional camera. Strain on the film increases rapidly to the point where perforations tear and the film breaks.

* Presented before a joint meeting of the Northern New England Section and Lowell Textile Institute Student Chapter, on April 16, 1948, as a contribution from the Student Chapter.



Courtesy, C. M. Krook and K. R. Fox

Figure 1
Photograph of V-Shaped Opening in a Fabric as Load is Applied in a Tongue-tear Test.



Courtesy, Eastman Kodak Co

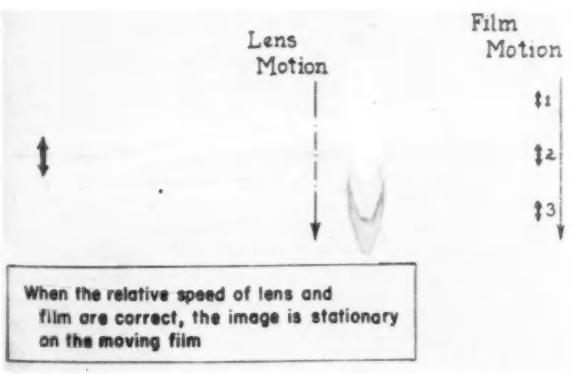
Figure 2
Early Edgerton High-speed Motion Picture Camera.
Electrical contacts on the film drive set off the lamps, which have a light duration of about 1/1,000,000 second.

By careful design and construction, camera builders did succeed in stepping up the speed of the movie camera, with an intermittent mechanism, to about 240 frames per second. This, however, was far below that needed to solve the many engineering and design problems associated with high-speed mechanisms. It became evident that the only way to reach higher speeds was to design a camera in which film could move continuously.

Figure 2 represents a solution to this problem worked out by Dr. Edgerton. The lamps, in conjunction with the electrical apparatus seen in the center, produce intense flashes of light with duration of about one millionth of a second. The camera is shutterless, and so designed that film moves through the gate continuously. Electrical contacts on the film drive synchronize light flashes with film movement, so that pictures are properly spaced on the film.

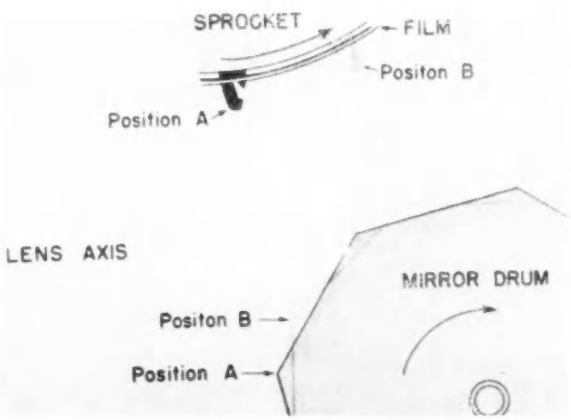
Another way of solving this problem is to build a camera in which the image moves with the film during the exposure interval. There are a number of ways of doing this. One is to employ a moving lens as shown in Figure 3. Three successive positions of the lens in its downward motion are shown. The corresponding positions of the images are numbered. If lens movement be properly linked with film movement, the image can be made stationary on the surface of the moving film during the exposure interval. A camera based on this principle was constructed with 48 lenses mounted on a rotating disc. Although theoretically sound, this method did not work well in practise.

Another solution is represented in an early high-speed camera manufactured first by Erneman and later by Zeiss-Ikon. The principle is shown in Figure 4. Behind the camera lens is placed a rotating drum bearing eight mirrors. These reflect light upward to the film on which the image is formed. As the drum rotates from A to B the image shifts. By proper synchronization the image can be made to travel at the same speed as the film. This method has a serious disadvantage in that focusing


Lens Motion
Film Motion
1
2
3
When the relative speed of lens and film are correct, the image is stationary on the moving film

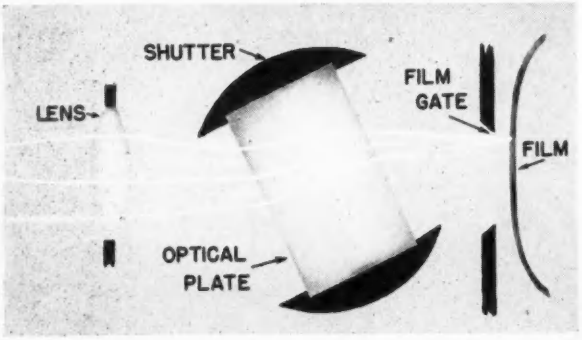
Courtesy, Eastman Kodak Co.

Figure 3
Diagram of Moving Lens Type of High-speed Motion Picture Camera. Lens speed is synchronized with the film motion, and 48 lenses are used, mounted on a rotating disc.



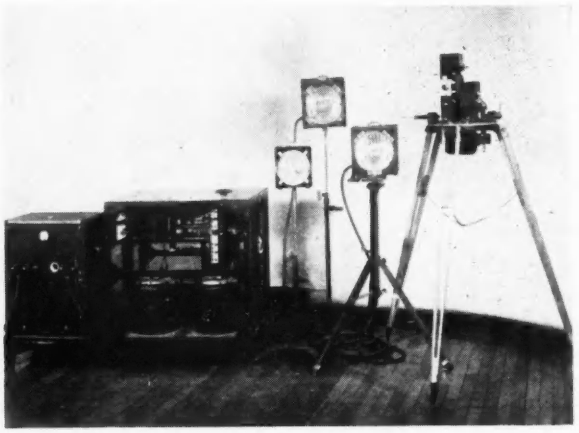
Courtesy, Eastman Kodak Co

Figure 4
Diagram of Rotating Mirror Type High-speed Motion Picture Camera. The drum bears eight mirrors, and is so synchronized that the image travels at the same speed as the film.



Courtesy, Eastman Kodak Co.

Figure 5
Diagram of Rotating Plane-prism Type High-speed Motion Picture Camera.
Optical plate and film speed are synchronized so that the image travels at the same speed as the film.



Courtesy, Crompton & Knowles Loom Works

Figure 6
Photograph of Crompton & Knowles High-Speed Camera which Permits Individual Exposures in the order of 1/200,000 Second to be Made.

must be through lenses supplementary to the camera lens. This is because the relation between lens-mirror distance and film-mirror distance must be fixed at a certain value.

A number of other solutions to the problem of synchronizing a moving image with a moving film have been worked out, but in almost every instance the resulting camera has been unreliable and difficult to use. In most cases it has been bulky and not readily portable.

The Eastman Kodak Company developed one of the first really practical high-speed cameras on the market. It employs a rotating optical glass plate, which, through refraction acts as a shutter for the continuous moving film. Figure 5 shows the shutter at a point in its rotation at which it is just admitting light from the lens to the film. The optical plate is at an angle to the lens axis. A ray of light striking the plate does not pass through, but is deflected. Thus the image that would otherwise fall in the center of the film gate now appears at its upper edge.

As the shutter rotates, the image shifts downward continuously at the same rate of speed and direction as the film. The result is a relatively stationary image for a brief period of time, permitting sufficient length of exposure. The opaque ends act as a shutter to cut off light rays, and the cycle is then repeated.

Now for some specific examples. The Draper Corporation uses one of these Eastman cameras for analyzing pick motions, check straps, cam action, flight of shuttle, etc. During the war, a cordage mill developed a nylon breeches buoy rope to replace the conventional hemp rope. They found that in firing, the nylon rope came out of the gun all right, but always tangled. They studied this trouble with stroboscopes and other devices, but could not find the cause because the projectile was moving too fast. At last they resorted to high-speed motion pictures. By photographing the muzzle of the gun as it was fired, they found that the nylon was not as stiff as the hemp and as a result the coils fell down and tangled. They developed a new way of winding the coils and solved the problem.

Crompton & Knowles pioneered in photography as an aid to loom design. Figure 6 shows their apparatus and the camera which they developed themselves. They claim *(9)* this has an advantage over others in that the speed of individual exposure is greater, in the order of 1/200,000 of a second and believe they obtain increased definition and clarity in their pictures. They use the camera *(10, 11, 14)* not only to record behavior of moving parts, but also to measure velocity and acceleration of things like the shuttle, which as freely moving bodies have no direct connection with the machine itself.

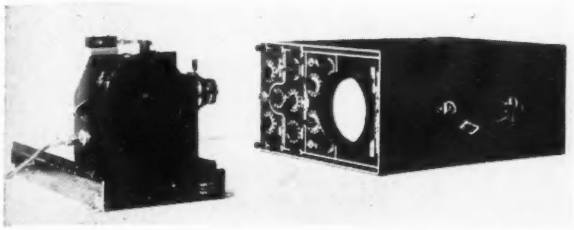
On these films, Crompton & Knowles have seen that the picker stick on a loom bends at the throw during the picking action. This explains why mathematically developed picking cams do not work unless the designer has had access to experimental data. The properties of the picker stick are similar to those of a golf club and the resilience of the stick contributes to the velocity of the shuttle. A number of concerns have unsuccessfully tried metal picker sticks on looms having cams developed by trial and error for wooden picker sticks. The right procedure is to make the picker stick and then to design a cam to go with the resilient properties of the stick.

Other studies with high-speed motion pictures have shown the shuttle plowing into the shed. If the shed, particularly at the selvage, has not opened sufficiently, the shuttle will lift the ends and abrade the yarns. The cause may be improper hanging of harness shafts by the loom-fixer or improper timing of the mechanism to actuate the harnesses.

Another condition not visible to the naked eye, but apparent in these high-speed movies, is that in front of the reed there may be a ripple in the cloth just at the beat-up. This is due to the cloth becoming slack at this position of the reed, and the warp being subjected to a definite increase in tension.

A stroboscope is practically useless for these observations because of the relatively low frequency at which the shuttle passes a given point in the machine. Prior to taking these pictures, formulas for computing contours of various cams on the loom were developed from fundamental equations of motion derived by calculus, with certain constants assumed. After the pictures were taken, these constants could be corrected, and mechanisms improved.

Professor Edward R. Schwarz *(13)* and his associates at the Massachusetts Institute of Technology, developed the Slater Impact Tester. A 25 or a 500 pound weight is released from a magnet above the ceiling. As it falls, it picks up the lower end of the specimen, held in a floating jaw, and carries it to failure. An electric strain gage supports the upper end of the sample and registers the force on an oscillograph screen after amplification by vacuum tubes. The image on the oscillograph is photographed by means of the specially designed high-speed camera shown in Figure 7. A strip of highly sensitive film on a rapidly moving drum rotates in a vertical plane while the oscillograph deflection appears in a hori-



Courtesy, Edward R. Schwarz

Figure 7

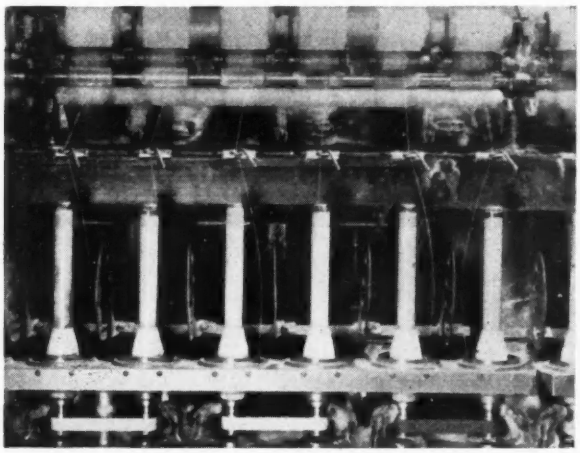
High-speed Motion Picture Camera and Oscillograph Set to Record Load-deformation Curves for Slater Impact Tester.

zontal plane. Thus motion of the oscillograph spot is spread over a portion of the film strip, its length depending on duration of the test. For intervals of less than 1/100 of a second, the diagram photographed on the film may be several inches long and ½ to ¾ of an inch in height. The load is in the vertical axis, and extension in the horizontal. The record may be taken in less than 1/1000 second, and is precisely the load-deformation behavior.

High-Speed Still Photography

High-speed still photography is achieved by means of stroboscopic lamps and a conventional camera. The flash is so rapid that the regular shutter is used but to keep out extraneous room light. Several years ago, the Victor Ring Traveler Company made studies to improve their traveler design (3). Figure 8 is a photograph of a ring spinning frame. The yarn comes through the rolls at the top, passes through the yarn guide, then through a small piece of C-shaped wire known as the traveler, riding on the ring surrounding the bobbin. The traveler is responsible for the twist being inserted in the yarn, helping to regulate strength, elasticity, and other properties. The traveler may rotate as fast as 10,000 rpm, or better than a mile a minute. One can easily see that if these travelers were not balanced properly, they would not only wear out rapidly, but also produce uneven yarn. Figure 9 is a picture taken by Dr. Edgerton, at a speed of 1/75,000 of a second, showing the improved traveler developed by Victor.

This traveler floats around the ring with contact only at one point on the inside of the flange of the ring. When the picture was taken, the traveler was revolving around the 1-3/16" ring at speed of 8800 rpm. This is a surface speed of 2735 feet per minute. The only way engineers could study the traveler effectively, to provide proper balance between tension on yarn, centrifugal force, and weight of the traveler, was by means of these photographs.



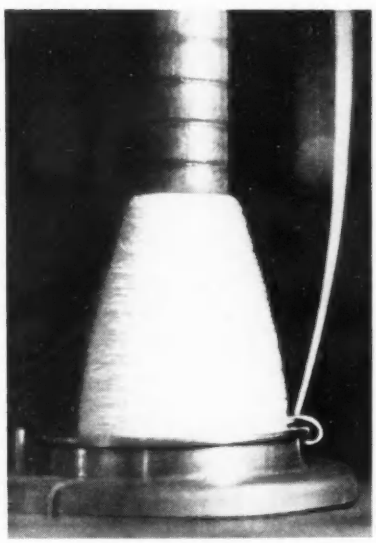
Courtesy, Harold E. Edgerton

Figure 8

High-speed Still Photograph of the Path of Yarn Through a Ring Spinning Frame.

The yarn passes from the roll at the top, through the yarn guide, and balloons to the traveler riding on the ring surrounding the bobbin.

Figure 10 is a picture of the Draper Corporation test set-up for taking high-speed still photographs. Using a set-up similar to this, Crompton & Knowles have studied various loom motions. Figure 11 is of the bobbin being transferred in a loom running at 172 rpm. The bobbin transfer must occur without stopping the loom. At the instant shown, the new bobbin is moving at a speed of approximately 30 feet per second.



Courtesy, Victor Ring Traveler Co.

Figure 9

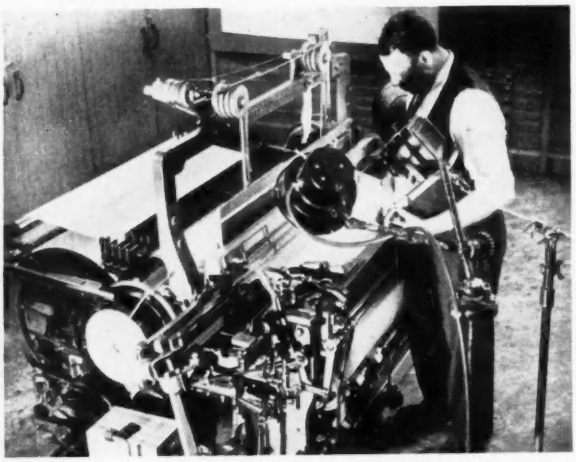
High-speed Still Photograph of a Ring Spinning Frame Traveler Rotating at 8800 Rpm. Photograph was taken at a speed of 1/75,000 seconds.

Intermittent, Infra-Red and Ultra-Violet Photography

The seeming antithesis to high-speed photography is intermittent photography (4). In this, pictures are taken at intervals over a long period to record such things as tension, diameter, and time. The Universal Winding Company uses this type of photography to a great extent, and Figure 12 is one of their pictures. These particular pictures record automatically readings every minute over many hours. The alternative would be manual recording, but this is tedious and would be inviting clerical errors. Besides, it would have been impossible to record all points simultaneously, exactly on the second. The clock closes a circuit to actuate a solenoid and takes the pictures.

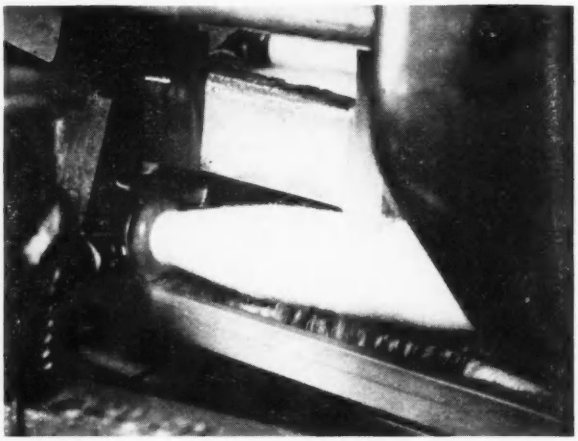
Certain dyes appearing the same visually may differ in the infra-red or ultra-violet ranges of the spectrum. Some dyes used for camouflage during the war were similar to foliage visually, but differed in the ultra-violet and infra-red; so reconnaissance planes photographed landscape and troops with emulsions sensitive in these ranges. Later, dyes similar to foliage both visually and in the infra-red and ultra-violet were used for camouflage. Photography offered simple means of choice.

It was desirable that uniform fabrics to be used by troops in tropics or polar regions be either infra-red reflecting or absorbing, thus affecting the warmth of soldiers wearing them. Photography offered simple means of measuring the degree of infra-red absorption, through use of infra-red sensitive emulsions.



Courtesy, Draper Corp.

Figure 10
Typical Test Set-up Used in the Study of Loom Shuttle in Flight.



Courtesy, Crompton & Knowles Loom Works

Figure 11
High-speed Still Photograph of a Bobbin in Process of being Transferred in Loom Running at approximately 172 Picks per Minute.

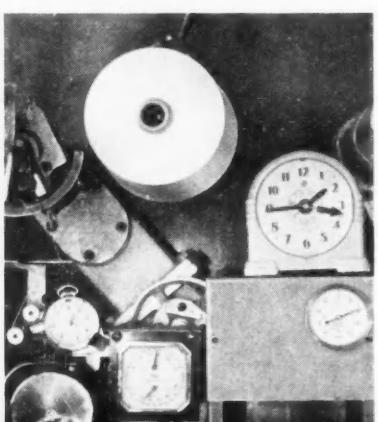
A spectrophotometer may be used to measure ultra-violet reflection quantitatively; but quartz prisms, lenses, and light sources have to be used. This entails great addition to the cost of the instrument. Photography offers an approximate solution of some problems at less expense.

Electron Micrographs and X-ray Diffraction

The electron microscope developed in recent years permits magnifications never before attained with good resolution. Photography offers the only means of recording these. Figure 13 is a picture of a wool fiber made by the replica technique of Barnes, Burton, and Scott (*1*), and shows the gross scale features. By means of this technique, the surface characteristic of all fibers may be studied with magnification and resolution which only the electron microscope affords.

Millson, Watkins, and Royer (*8*) have made studies of the crocking of wool. They found by employing electron micrographs, that particles of dye were deposited on the surface of wool fibers and were concentrated in the area where the scales joined. Apparently particles of dye were deposited on the outside of the fibers during the early stages of dyeing and redissolved with time and an increase in temperature, finally penetrating the fibers. However, some crocking was obtained in practically all cases, because some of the dye did not redissolve but remained on the surface of the fibers through the entire operation. It appeared that the amount of insoluble dye particles varies with the individual dye and with the method of application.

X-ray diffraction permits study of the degree of orientation, both of the molecules and to the axis of the fiber to be measured. It tells the type of crystalline structure, the crystallographic spacing, the spacing of repeat units in the molecule, and the spacing between chains. These molecular properties affect certain physical properties of the fiber such as strength, elongation, elasticity and dye affinity. It is probable that in the future, fibers will be built to order with certain characteristic properties, and x-ray diffraction studies do help considerably in this work. Photography offers the best means of seeing and studying these.



Courtesy, Universal Winding Co.

Figure 12
Intermittent Photograph Whereby Such Variables as Tension, Package Diameter, Temperature, Humidity and Time Are Automatically Recorded at Given Intervals over a Long Period of Time.

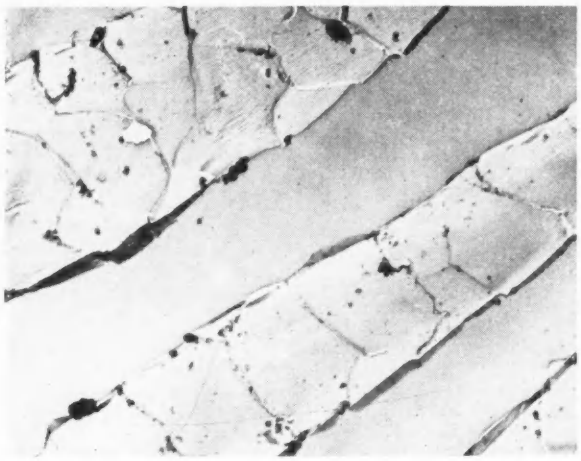
Figure 14 is a typical x-ray diffraction picture of cotton. That the fiber is somewhat crystalline is shown by the fairly defined rings. The fact that the arcs are long indicates that though the molecular orientation is high, the axis of orientation is not that of the longitudinal axis of the fiber, but is approaching it because of the discontinuity.

Berkley (*2*) has found that there is a relatively high correlation between the spiral structure of the crystallites in the cell wall of a cotton fiber and the tensile strength. An index of the angle of spiral is given by the so-called "x-ray angles." In general, the steeper the pitch of the spiral the greater the fiber strength, and vice versa.

Fluorescent Photography

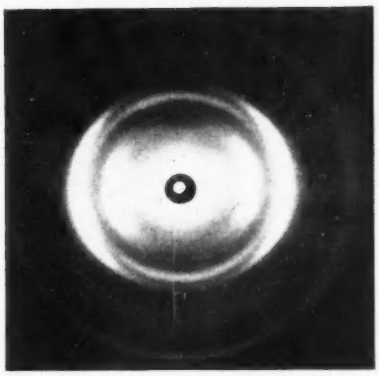
By employing fluorescence (*12*), active mildew on wool can be distinguished by brighter fluorescence than that of the wool itself. This test can be used to detect, and thus to prevent, the destruction of wool while in storage. Photography has the advantage of being able to record weak fluorescent and phosphorescent effects which may be difficult to observe visually.

Millson and Royer (7) have developed a method of using fluorescent dyes for diffusion studies. Such dyes glow in ultra-violet light and reveal their position within each textile fiber. Thus the penetration speed of dyes in any method of application can be determined. Slight variations in the surface structure of synthetic and natural fibers may also be detected. When fibers such as cotton, wool, Aralac, nylon, Lanital, viscose, silk, Vinyon, and acetate have been dyed with fluorescent dyes, the location and extent



Courtesy, Stamford Research Laboratories, American Cyanamid Co.

Figure 13
Electron Micrograph of Wool Fiber Showing Gross Scale Features, Using the Polystyrene-silica Replica Technique.



Courtesy Wayne A. Sisson, American Viscose Corp.

Figure 14
X-Ray Diffraction Photograph of a Cotton Fiber Illustrating its Characteristic Features.

of penetration of very small quantities of a dye can be detected by examination of the cross-section in an ultra-violet microscope. Only those portions of the fibers where dye has penetrated show marked fluorescence. Photomicrographs taken with ultra-violet light of cross-sections of samples removed during the early stages of the dyeing operation, show that the outer portion of the fiber is fluorescent and therefore dyed, while the inner, undyed portion of the fiber does not fluoresce and appears as a dark area. Every type of fiber studied develops a definite ring formation during the early stages of exhaustion of the dye from the dye bath. This development of rings demonstrates that all dyes are absorbed onto the outside of the fibers first. Furthermore, the extent of diffusion and length of time required for complete coloring of individual fibers are dependent upon the type of dye, condition of the dyebath, dyeing temperature, swelling of the fiber and affinity of the fiber for dye. Under adverse conditions, all the dye can be exhausted from the dyebath to the fibers, but very little, if any, diffusion of the dye into the fibers will be obtained. Since all fibers absorb dye on their outside surfaces, it is extremely important for textile fibers to be clean and free from extraneous materials in order to allow proper penetration of the dye. When they are not removed, oils, grease, waxes, and materials of this kind usually appear as resist spots, because they do not allow the dye solution to come in contact with the fibers.

It has been shown that dye penetration into the individual fibers takes place from the outside surface, and that after the dye has left the bath, the dye still distributes itself within the individual fibers.

A method has been developed, using the cross-section method for studying level dyeing *(6)*, which makes it possible to see how individual fibers are dyed. It is easy to see whether a dyeing is good or bad by rough examination under the microscope, but when differences in level dyeing characteristics are not very great, it becomes more difficult to judge the levelness of fiber dyeing by such an examination. To differentiate between small differences, a fluorescent method was devised. The wool on which the dye was to be tested for level fiber dyeing was first dyed with a level dyeing fluorescent dyestuff, which showed by cross-section examination a brilliant fluorescence of about the same intensity throughout all the fibers. When the wool was subsequently redyed with a non-fluorescent dyestuff, the fluorescence was covered wherever the second dye penetrated. Fluorescence was obtained only from the portions not dyed.

A similar procedure could be used with contrasting colors in ordinary light, but the ultra-violet light gives a much more marked contrast since it accentuates small amounts of the fluorescent dye.

We have attempted to review some of the applications of photography in which it has been not just a convenient means of recording data, but actually a tool. Photography is but 109 years old. What the future will bring, and what its new applications will be, rests only with the inventive genius and ingenuity of man.

Acknowledgments

The author wishes to express his appreciation to the following persons and organizations for their assistance, suggestions, and the use of material: Dr. R. Bowling Barnes of the American Cyanamid Company, Dr. Earl E. Berkley of the National Cotton Council of America, Mr. Paul G. Desilets of the Gilbert Studios, Mr. J. D. Gannett of the Draper Corporation, Mr. John E. Hull of the Victor Ring Traveler Company, Mr. Waters Kellogg of the Universal Winding Company, Mr. Frank J. O'Neil of Pacific Mills, Mr. Albert Palmer of Crompton & Knowles Loom Works, Dr. G. L. Royer of the Calco Chemical Division, American Cynamid Company, Mr. M. L. Sandell and Mr. A. C. Schmitt of the Eastman Kodak Company, Prof. Edward R. Schwarz of the Massachusetts Institute of Technology, Dr. Wayne A. Sisson of the American Viscose Corporation; and Dr. Harold C. Chapin, Mr. Kenneth R. Fox, Dr. Chapin A. Harris, Mr. Ernest P. James, Prof. John H. Skinkle and Mr. Louis W. Stearns, all of Lowell Textile Institute.

Literature Cited

(1). Barnes, R. B., Burton, C. J., and Scott, R. G., "Electron Microscopical Replica Techniques for the Study of Organic Surfaces." "Journal of Applied Physics", *16*, 730-39 (1945).
(2). Berkley, E. E. "Cotton—A Versatile Textile Fiber." "Textile Research Journal," *18*, 71-88 (1948).
(3). Hull, J. E. Private Communication.
(4). Kellogg, W. Private Communication.
(5). Krook, C. M., and Fox, K. R. "Study of the Tongue-Tear Test." "Textile Research Journal," *15*, 389-96 (1945).
(6). Millson, H. E., and Royer, G. L. "Microscopic Observations of Wool Dyeing—Part 2." "American Dyestuff Reporter," *29*, 607 (1940).
(7) Millson, H. E., and Royer, G. L. "Microscopical Observations of Union Dyeing." "American Dyestuff Reporter," *31*, 280 (1942).
(8). Millson, H. E., Watkins, W. H., and Royer, G. L. "Studies on Wool Dyeing: Crocking." "American Dyestuff Reporter," *36*, 45 (1947).
(9). Palmer, A. Private Communication.
(10). Palmer, A., and Ramsdell, F. A. "'Shooting' the Loom." "Textile World", April, 1935.
(11). Ramsdell, F. A., and Palmer, A. "Speed Copes with Speed in Study of Design." "Machine Design," Vol. 7—No. 3 (1935).
(12). Royer, G. L., and Maresh, C. "Photography of Fluorescent Phenomena." "Journal of the Biological Photographic Association," *15*, 107-19 (1947).
(13). Schwarz, E. R. "Samuel Slater Memorial Textile Research Laboratory." "Textile Research Journal," *15*, 33 (1945).
(14). Sepavich, V., and Palmer, A. "High-Speed Photography and the Study of Rapid Machine Motions." "Mechanical Engineering," *62*, 519-527 (1940).

New York Section—

TRADE PRACTICE RULES AND TEST PROCEDURES FOR TEXTILES*

HENRY MILLER

Director, Bureau of Trade Practice Conferences and Wool Act Administration, Federal Trade Commission

TRADE practice rules approved and issued by the Federal Trade Commission cover many different industries and products. A large body of the rules, however, operate exclusively in the field of textiles. They are directed to the task of eradicating and preventing unfair trade practices and affording guidance and assistance to industry and trade groups. Their objective is to help in making it possible for business and the public to continue to enjoy the fruits of free and fair competition. Laboratory tests and testing procedures, particularly those relating to the questions of performance of fabric in one way or another, play a very important part in the operation of such rules.

The mind of mortals has, in the past, devised an impressive number of trade methods and practices which come within the condemnation of the law as unfair. To keep them under control many of such evils, with the help of industry leaders, have been defined and catalogued in the rules and rulings of the Commission and provision has been made for preventing their use in the conduct of business. While time would not permit of an attempt to touch upon all of them, I believe those of immediate interest to you this evening are rules relating to selling claims, or representations, under which the various fabrics or articles are marketed. I shall try to cover them as briefly as possible. They include the matter of labeling which in reality affects or characterizes the entire program of selling, whatever the means or methods might be through which the fabric, garment, or product is offered and promoted. It is, moreover, in this field that testing and test procedures play a highly important part, especially in relation to means of checking and making necessary determinations as to whether the selling claims can be justified or properly made.

Businessmen need to know what the requirements are that they are expected to observe, and I am glad to do everything possible to help them become informed and to be guided in the right course. So the question arises: What are the requirements?

An Overall Requirement

First, it should be plainly understood that regardless of whether or not there are specific rules which have been worked out on the subject, there exists as a matter of law the over-riding principle that all labeling is required to be truthful and free from deceptive or misleading tendencies or effects. This applies irrespective of whether the label is of the voluntary or obligatory class. It also applies to whatever advertising or sales promotion of any other type is used.

This ever-operative requirement is well recognized in industry and trade as essential. While it is elemental, it must nevertheless be given constant attention in the application of law and trade practice rules in order to avoid having products pass to purchasers or consumers under conditions which may prove to be misleading or deceptive. Trade practice rules are intended to and do afford the businessman quite extensive information and guidance to help him in checking his advertising and labeling claims against possibilities of infractions.

Although it may be said most people quite well know they must not use untruthful or deceptive representations, some may not be so clear as to situations in which they may be required to label or as to what the label or advertising must include, either as basic disclosure or as explanatory information in relation to other words or statements used. The rules already available afford considerable help on these points and other proceedings in process for approval will provide further guides.

Coordinated Principles of Rules

The code of marking rules for the Rayon Industry issued in 1937 and those issued for the Silk Industry in 1938 and for the Linen Industry in 1941 plus the Wool Products Labeling Act and the Rules thereunder, which also became effective in 1941, cover practically all of the content disclosure requirements presently in operation. Although each of these sets of rules covers different segments or groups of textile products, as their titles indicate, there runs throughout the uniform principle of simple fiber identification or disclosure of content. Whether the article be made of rayon, silk, linen, or wool, or of a blend, mixture or combination containing or simulating these fibers, the idea is: Let the label forthrightly disclose the fiber content, whatever it may be. Misunderstanding and confusion disappear when the truth is revealed. Restrictions are not placed on the type of material or article, blend, or kind of fabric one may use. But whatever is used, the content is to be revealed that the product may be marketed on the basis of knowledge and without misunderstanding or deception as to what the composition is.

Wool Products Labeling Act

Turning first to wool, the content labeling requirements which are specified by the Wool Labeling Act and Regulations are applicable, with but few exceptions, to all fabrics and manufactured textile products which contain, purport to contain or are represented as containing woolen fiber in whole or in part. The exceptions are carpets, rugs, mats and upholsteries. In the broad field covered, the product, when placed on the market, must carry a stamp, tag, label, or mark of identification showing the name and percentage of each different fiber present in the fabric or article, with the privilege, of course, of covering miscellaneous small amounts of non-woolen fibers by blanket designations, such as "Other Fibers". With respect to the woolen fibers present, these are required to be shown in accordance with three classes, namely, "wool", "reprocessed wool" and "reused wool". Non-woolen fibers, of course, are also to be revealed. In apparel certain exemptions

* Presented at meeting, New York Section, January 28, 1949.

are applied to linings, paddings, stiffenings and trimmings. Further, the label is required to be identified by the name of the manufacturer or the name of a person subject to Section 3 of the Act. The identification requirement may also be acceptably met by the manufacturer showing his registered identification number and the name of the dealer or reseller. Manufacturers may obtain registered identification numbers upon application to the Commission. Maximum percentage, of loading and adulterating materials, if any, are likewise required to be disclosed on the label. Producers or distributors are privileged to supply their customers with a guarantee of the reliability of their labels which guarantee, acted upon in good faith, protects the dealer or other reseller in the event the label proves to be false. Another requirement is that manufacturers shall keep records of the fibers used in the make-up of their fabrics or products.

It will be noted in regard to wool products that the label is required not only to name the substantive fibers present, but also to show their respective percentages. The trade practice rules for rayon, silk and linen products follow the same principle with this exception, namely, that percentages of the different fibers present are not generally required respecting fabrics or blends which fall outside the scope of the Wool Labeling Act. While percentages are not required to be given generally under such silk, linen and rayon rules, nevertheless these rules contain provisions for the disclosure of percentages on a voluntary basis and for requiring the disclosure of percentages of those fibers in the blend which are in such small proportion that the naming of the fiber would be misleading if unaccompanied by disclosure of the percentage. In respect to fabrics or products where percentages are not required or given, the fibers are nevertheless to be named and listed in the order of their predominance by weight.

Rayon Rules

Content disclosure has now many years of experience behind it. Among the first specific provisions on the subject are those found in the Rayon Rules.

When the impact of the commercial product of the cellulose base synthetic, known as rayon, hit the market, great confusion, misunderstanding and deception arose. This, it was found, was largely due to the lack of an officially recognized generic name for the new product. The fiber was promoted under a great many different names which opened the door wide to misunderstanding and confusion. Its fabric was variously called artificial silk, art silk, silk, and by many fanciful, coined or trademark names which were not in fact generic, but purported to be. Certain leaders in the trade recognized the need for having a generic name, and, after much effort and struggling, the word "rayon" was born. In due course the term "rayon" received official recognition by the Federal Trade Commission and it has since achieved worldwide use. The rayon trade practice rules, approved by the Commission after extensive study and investigation, provide for use of the word "rayon" as the generic name for this fiber, whether made by the acetate, viscose, cuprammonium or nitrocellulose process. These also provide for disclosure of content by naming the different fibers in their order of predominance. While the rules still follow such widely established generic name rayon, they also provide for use in conjunction with "rayon" of the words "acetate", "viscose", etc. as a means of differentiating between the respective types of man-made cellulosic fibers.

Silk and Linen Rules

The Silk rules, besides affording full details for content marking on the same principle, also provide for proper marking of weighted silk. If the product has been weighted with metallic substances, the mark is to show that such weighting material is present, together with information as to the range, quantity, or limits of the weighting applied. Specifications are also included for the proper use of the term "Pure Dye Silk". Now that silk appears to be re-entering the market, it seems advisable that members of the industry and trade concerned familiarize themselves with these rules, copy of which may be obtained from my office upon request.

In the Linen rules the fiber identification principle which I have mentioned is likewise carried out, with provisions which tailor the requirements to fit the variety of linen and part-linen articles. And as a final item, it may be of some interest to know that the Linen Rules also contain provision as to size marking and on the use of shrinkage terms. The latter parallel the trade practice rules issued in 1938 regarding shrinkage of woven cotton goods. There are other provisions of detail but what has been said will be, I trust, sufficient to afford a general idea of the basic requirements.

Effects Highly Salutary

The four sets of marking rules or regulations that I have referred to do not, of course, cover the entire range of textiles. They do, however, embrace a very large part of it. This will be apparent when we realize that the coverage of wool, silk, rayon and linen not only embraces products of any one of these fibers but also all blends or combinations in which one of such fibers is present in some degree.

The rules have on the whole brought very substantial improvement in the merchandising of textiles. While the ultimate or ideal has not been attained, the progress thus far made is truly substantial. In my opinion, it constitutes a tribute to the many men and women throughout the textile field who are constantly striving to raise the standards of fair practices.

Testing and Test Procedures

Permit me now to turn to the second half of my subject, that is, to the subject of test methods or procedures and their utilization in connection with fair trade practice rules. Standard or recognized test procedures are not only desirable but in many instances they are virtually indispensable to the just solution of trade practice problems. Usually the need of standard or recognized test procedures is most acute in connection with the treatment of labeling, advertising or promotional claims as to performance of the fabric and product made therefrom. This was found to be true in the conference proceedings which led to the establishment of our shrinkage rules regarding woven cotton merchandise. The problem of determining the potential or remaining shrinkage in preshrunk fabric as a basis for truthful or nondeceptive claims in advertising or selling, pointed up the need for a standard or recognized test method. As a result, the rules when finally approved by the Commission contained provisions that the shrinkage tests specified in Commercial Standard CS59 shall be regarded as acceptable with respect to determination of the facts behind such representations as "preshrunk", "nonshrinkable", etc.

Right now we have pending industry conference proceedings to work out other textile rules in which the establishment and approval of appropriate test methods is a major consideration. One of these pending matters under consideration is the trade practice conference proceeding for water repellent outerwear, or what is known generally as rainwear. Test methods are required which will be appropriate for satisfactorily evaluating or predicting the performance of the fabric under varying conditions such as light rains, showers, downpours, storms or long continued rains; tests for determining the durability of water repellent treatments in order to differentiate between those that require the fabric to be retreated periodically, or after cleaning or washing, from those which are

(Concluded on page P280)

Hudson-Mohawk Section—

CHANGING ASPECTS IN DYEING AND FINISHING*

L. S. THOMPSON
General Dyestuff Corporation

Introduction

THE rapid improvement in the design and construction of new equipment together with the increasing number of new dyes and chemicals has brought to the fore many changing aspects in the dyeing and finishing of textiles. These changes emphasizing streamline operation have necessitated a speeding up of time factors with increasing importance placed on chemical controls. As a result it has been possible to increase production at lower cost without the sacrifice of quality.

Fabric designs with the utilization of many new fibers have also brought many new problems to the modern dyer and finisher. It is the purpose of this paper to discuss some of these developments in terms of current practice.

Prepare

This, the first step, is equally important as the method of dyeing and great care should be exercised in the preparation of the material. The removal of oil, sizing, and sightening colors from the goods prior to dyeing is done on a padder, a continuous open width boil-off unit, a jig, or a dye beck depending upon the construction of the fabric.

Desize

Mixed fabrics today are usually woven without starch and therefore do not require the lengthy desizing operation. However, should the dyer find starch present, the customary procedure of saturating with enzymes, followed by washing, is necessary. A new development for flat fabrics is to pad the enzymes, plus a wetting agent, at the recommended temperature (new enzymes applied at high temperature, 160°F., would be recommended), followed immediately by running through boiling salt solution on a Williams Unit. The pad steam process is also suitable for this new method.

* Presented at meeting, Hudson-Mohawk Section, November 19, 1948.

Boil-Off Units

The main boil-off takes place in the dye beck or jig. However, the new presetting machines give a preliminary partial boil-off. Such machines are indispensible for many spun rayon plied yarn fabrics to eliminate creases and to obtain relaxation. We refer to those machines having large tank capacity into which the cloth enters in a relaxed form and is conveyed through the scouring bath. The new drum type machines perform their best function when they are supplemented by a thorough rinse or complete scour in tandem. It is readily understood that material when taken off without this supplementary treatment cannot be stored any length of time, because the impurities tend to distribute themselves unevenly on the fabric during drainage.

Clean goods on the other hand supply an abundant back log for the dyebecks and curtail the time of goods in the dyebeck. The scouring baths used for presetting are preferably made up with synthetic detergents that are stable to hard water. A satisfactory formula is one pound synthetic detergent plus two pounds tetrasodium pyro phosphate per one hundred gallons. The scouring bath proper is also made to the same concentration; the time factor and agitation in rope form give the required mechanical action for a thorough scouring.

Fabrics that do not require presetting are handled on the rope scouring range or directly in the dyebeck. For flat goods, the boil-off can be accomplished directly in the jig or in open width washers of the multi-compartment type with the same detergent concentrations as mentioned. It is found that the majority of sightening tints are removed by the mentioned treatments; difficult cases of tints are usually given individual treatment such as cold water wash before presetting (open width) or an addition of hydrosulfite in the presetting unit.

Bleaching

For special lots that require a full white, the use of peroxide in the dyebeck is most satisfactory. For large runs, continuous methods should be employed. One application is to pad goods in the grey with a cold buffered peroxide bleach, and a synthetic detergent which acts as a penetrant. After padding, goods must be allowed to stand several hours before scouring in continuous form. The detergent that was employed as a wetting agent becomes a scouring agent in the hot rinse. For small lot flat fabrics, the standard peroxide bleach would be satisfactory, and is carried out on the jig.

Peracetic acid for bleaching of acetate and/or viscose rayon is appearing to be of interest. It has been found by this method that a reduction of ends on the jig is possible and that equal and in some cases superior whites are obtained than with peroxide.

Dyeing

The dyeing of rayon in the dyebeck or kettle by the single strand or piece is more or less standard practice in the majority of rayon dye houses. However, for plants that have yardage sufficient to employ the new presetting machine which scour and deliver to the dye kettle in large amounts, the threading up by the continuous method of the conventional kettle for dyeing has increased production to a large extent. This continuous threading is accomplished by installing two or three pot eyes at a convenient angle on each end of kettle. The lacing or threading up is done by throwing first end over reel and following in spiral direction, leaving sufficient material in back of the reel for even pleating. When the reel is filled to capacity the ends are taken through pot eyes and sewed to form an endless strand. Upon completion of dyeing, the seam is broken and taken out also in continuous form ready for scutching and vacuum extraction in open width form. This arrangement cuts down the amount of handling to a minimum and speeds up production to a great extent.

Dyeing of Viscose Rayon and Cotton Mixtures

As a rule the dyeing of viscose rayon or cotton does not present any great problem, however when woven together to obtain desired fabrics some difficulties do arise.

All direct colors do not possess the same affinity for cotton as they do for rayon. For this reason, a selected group of colors must be chosen which will, when dyed at selected temperatures, produce equal shade and levelness on both fibers.

Colors with a medium rate of exhaust are the most suitable and are usually applied on either jig or dye box at a slower rate of speed than is customary for an all-cotton fabric. Colors with too rapid a rate of exhaust tend to exhaust on the rayon in preference to the cotton.

The dyebath for box work is usually started at 130°F. with ½% Igepon T or some other suitable detergent which will assist and promote leveling and penetration. The temperature is then brought to 200°F. in the course of approximately 20 minutes. Dyeing is continued for about one hour, during which time common or Glauber's salt is added if necessary. A patch is then taken and if on shade the steam is shut off and the bath is allowed to cool for about ten minutes prior to flush rinsing.

The following direct dyes have been found to produce a good union when dyed on 50-50 mercerized cotton and viscose rayon:

Fastusol Yellow LRRA Conc.
Fastusol Yellow LRTF Extra Conc.
Fastusol Orange L3RA.
Fastusol Red 4BA.
Benzo Fast Bordeaux 6BNL.
Fastusol Red Violet LRLA.
Fastusol Blue LGA Extra.
Fastusol Blue LBRRA Extra Conc.
Benzo Green BG Conc.
Benzo Fast Brown RLA.
Fastusol Brown LRBA.
Benzo Fast Black LA.

All of the colors mentioned with the exception of Benzo Green BG Conc. and Benzo Fast Black LA possess good to excellent light fastness while these two colors can be considered as having good fastness only when used in full shades. Not too much can be expected of direct colors in wet fastness including fastness to washing, water, and perspiration.

The use of Peregal O as a retarding agent has been found to be of considerable assistance in obtaining satisfactory unions due to its ability to retard the dyestuff until the cotton has had a chance to pick up its share during the first part of the dyeing operation. Thus, Peregal O can be recommended in obtaining uniformity of shade in mixtures of cottons and Viscose Rayon.

Dyeing of Viscose Rayon, Cotton and Wool Mixtures

Constructions of viscose rayon-cotton-wool are prepared with as little alkali as possible due to the injurious effect strong alkalis would have on wool. Scouring with disodium phosphate and Igepon at 170°F. has been found to give good results. Selected dyestuffs which produce fairly uniform shades on viscose rayon, cotton, and wool by the one bath method are usually started at a temperature of 100°F. and then raised to 200°F. in the space of one-half hour, run at this temperature for an additional half hour, then cooled during the space of one-half hour to permit filling of the shade on the rayon and cotton. If the wool is found to be slightly off cast, the addition of neutral dyeing acid dyestuff is recommended.

The fastness properties of dyeings produced by this method are at best fairly good to good, and in view of this fact, there has been a definite demand in the trade for fabrics of this class which will stand more stringent fastness requirements. The only dyestuffs which will meet such requirements are vat colors, their leuco esters, and possibly naphthols.

The vat colors are applied by one of the following methods:

1. Reduced pad, followed by re-reduction
2. Pigment pad-jig reduced
3. Pigment pad, reduced continuously
4. Vat acid pad, reduced continuously or on the jig.

For the dyeing of light shades, the reduced-pad method has been used successfully in continuous operation on standard booster box equipment at conventional temperatures, or more recently on the Williams Unit for shorter periods of time at more elevated temperatures, using in the padding liquor a protective colloid and ½ to 1 oz. caustic soda and hydrosulfite per gallon. The quantities of alkali and hydrosulfite will vary according to the depth of shade being dyed. The re-reduction bath should contain, in addition to a protective colloid, ½ to 1 oz. caustic soda and hydrosulfite each per gallon. The temperature of this bath is usually no higher than 130°F. to 150°F.

For the dyeing of heavier shades application according to the pigment pad-jig method is recommended, the padding liquor containing ¼ oz. Nekal BX per gallon is made up at 140°F. After padding, the batched roll is transferred to the jig for reduction. In view of the fact that we are dealing with animal fiber, it is assential to maintain a temperature no higher than 120°F. in the jig. In order to effect some protection of the wool, it is advisable to add a protective colloid such as glue, 2 to 3 lbs. per 100 gallons being sufficient.

The quality of caustic soda in the reduction bath is usually much less than would normally be used on all vegetable fabrics while the quantity of hydrosulfite is increased. Plant practice has indicated that practically no damage results to the animal fiber by running four to six ends in reduction.

It is most important that a good guide be established on the initial dyeing of a new shade in so far, as has been mentioned, a maximum of four to six ends on the jig for developing is mort important.

On completion of reduction, two running cold water rinses are given, and oxidation conducted with hydrogen peroxide and acetic acid. It is important that all the alkali be neutralized prior to soaping. This method of oxidation normally yields the brightest shade of the dyestuff in use.

It is well to remember that the jig roll must be kept in motion at all times throughout the reducing and washing operations as a safeguard against uneven oxidation.

Another pad-jig method for developing is by the use of trisodium phosphate. 4-8 oz. per gallon plus ¾ oz. per gallon of glucose, ¼ oz. per gallon of a protective colloid and 1 oz. per gallon of sodium hydrosulfite at a temperature of 140°F. Selected colors must be used, namely, those which yield a complete reduction by this method.

Practical trials already made have indicated that quality work can be performed with these blends by padding the pigment in the usual manner and conducting the reduction operation continuously in the William's Unit. The same precautions as previously mentioned must be taken, namely, the use of a protective colloid and minimum quantities of caustic soda. It is not as yet possible to make use of the higher reduction temperature usually employed when dyeing all vegetable fibers by this method. Temperatures of 150 to 160°F. have been found satisfactory.

Many trials by the vat acid process have been made and practical use of this method has found acceptance. The same advantages found when using this method on cotton fabrics hold for the dyeing of blends, namely, speedier conversion to the sodium leuco, and covering of mill imperfections. The general method of application of the vat acid process is similar to the pad-jig pigment pad method. The finer dispersion of the vat-acid assists penetration which results in a more even dyeing. This method also assists dyeing of blends through the use of milder alkalies, such as tri-sodium phosphate. Inasmuch as the vat-acid is more readily converted to the sodium leuco, this better penetration also produces in many cases

improved fastness to washing on the protein fiber. This method becomes of increasing importance as the wool content increases, such as in spun rayon-wool 60/40 blends. The vat-acid method is limited at the present time to the dyeing of light to medium shades.

The Algosols or leuco esters of vat dyes are of great value in the production of fast to light shades, on spun rayon-wool mixtures. Their ease of application and adaptability to continuous methods have increased this interest to the present era of streamline production. They are usually applied by the continuous method, using in the padding liquor ½ to 1 oz. per gallon sodium nitrite and developed by running through 1 to 2% by volume of sulfuric acid 66° Bé., at temperatures ranging from 120°F. to 160°F. Neutralization and soaping follow in continuous operation. The pad-jig method may also be employed, but the continuous method is preferred where equipment of this kind is available, because of the action of nitrous acid on the animal fiber, this action being accentuated in the jig operation.

The action of nitrous acid on protein fibers produces a yellow coloring matter which has very poor fastness to light. This yellowing, however, can be considerably eliminated by a subsequent treatment with 1% sodium bisulfite at a temperature of 200°F.

In blends containing more than 20% of wool, the shade change on exposure to light after 20 hours is quite pronounced, therefore a modification in the method of oxidizing is required. It has been found that by the use of 1% ammonium persulfate and 1% sulfuric acid, based on volume, satisfactory results can be obtained.

In view of the differential in cost between vat dyestuffs and their leuco esters, the use of the latter is usually confined to the dyeing of light to medium shades.

Selection of dyestuffs is of considerable importance in the production of satisfactory unions. It has been found that Blue GCD types are much more suitable than Blue BCS brands. Nevertheless as we increase the depth of the dyeing even with this type of blue, we frequently find that the animal fiber is lighter than the spun rayon. For the production of medium shades of blue, we have found that most satisfactory unions are obtained by replacing part of the Blue GCD with Navy Blue BRP adding Indanthrene Brilliant Green BN Pure Double Paste to obtain the required brightness.

Generally speaking, dyestuffs of the warm dyeing or even cold dyeing classes are better adapted for the dyeing of such blends, chiefly because they require less alkali for reduction. This does not provide us with a complete range of shades, and as a consequence we must, in many cases, resort to the use of the hot dyeing colors. As a class it has been found that all violanthrene types yield good union effects. Examples are:

Indanthrene Brilliant Violet 2RA-4RA
Indanthrene Direct Black RBA
Indanthrene Brilliant Green BN Pure Double Paste
Indanthrene Navy Blue types
Indanthrene Dark Blue BOD

It is frequently found that the shade of the respective vat dyestuffs on wool vary somewhat from the shades on spun rayon. This does not present any particular problem, because a study of this variation soon enables the dyer to make mixtures of types which will counteract the shade difference on the two fibers.

Cellulose Acetate Dyeing

The development of direct dyeing cellulose acetate dyes has made it possible for the dyer to produce a good range of depths and shades on various constructions of acetate fabrics. However, it is well known that gas fume fading, perspiration and wash fastness are still an important problem, especially in blues. To overcome, this it is necessary that the dyer select his dyestuffs with great care. For those fabrics in which light fastness is not required the azo blues offer the best solution, bearing in mind that a high temperature is necessary while dyeing. For light and medium shades the use of selected anthraquinone dyestuffs assures maximum fastness to light and will give some fastness to atmospheric fading.

The introduction of permanent inhibitors has improved the fastness to gas fading and they are now used to a great extent. These inhibitors are usually applied to the bath and the material treated at 110°F. for about 20 minutes before adding the dyestuff. Dyeing is then carried out in the normal manner. Some plants have found that by further application of an alkaline inhibitor in the finishing operation added protection is obtained.

Today, acetate yarn is being dyed in the package machine with the use of formic, acetic and sulfuric acids as welling agents together with selected acid dyes. Patent No. 2,249,607, held by L. Galatioto, gives descriptive details on the use of selected acid dyes with the mentioned acids.

An application of this method by padding has also been worked out using formic acid and selected acid dyes which, like in the package machine work, produce shades of excellent fastness properties.

One of the well known chemical companies is about to introduce another development for the dyeing of acetate by the solvent method, to be known under the name of Dytron. The original purpose of the Dytron Process is to make possible the rapid continuous application of acid dyestuffs to cellulose acetate fibers. The equipment necessary for this process is a conventional padder with a small dye pan connected in tandem with four open width wash boxes. These are used as follows:

#1 Box—Bicarbonate of Soda
#2 Box—Running cold water
#3 Box—Detergent rinse
#4 Box—Running cold water

Speeds as high as 60 yards per minute have been used to produce shades of medium depth. The wash fastness, crocking, gas fume fading and light fastness of these selected acid colors applied in this manner have shown very good promise.

The general method established for the application of developed black on all acetate or acetate-viscose piece goods with both dispersed and soluble dyes is well known as being a lengthy operation, in most cases taking about eight hours for completion.

In an effort to cut down this lengthy operation a method has been developed wherein this time of eight hours can possibly be cut down to six hours or less. This is accomplished as follows:

The dye is dissolved or dispersed as usual, and added to the dyebath at 130°F. The temperature is raised to 190°F.-200°F. and the goods are run at this temperature for 45 minutes. At this point the steam is shut off, one-half as much Developer O.N.S. as dyestuff used is added, and the goods are run for an additional forty-five minutes. If after 45 minutes running in the cooling bath the temperature has not dropped to 120°F. cold water may be added to the dyebath.

The diazotizing and developing are carried out simultaneously in the original dyebath by adding 4% to 8% hydrochloric acid 20° Bé. at which point the bath should have a pH of 2.5; the goods are run for 15 minutes and then 6% to 8% of sodium nitrite are added and developing is continued for 20 minutes.

The bath is then flushed clear and the goods are aftertreated as follows:

(1) All acetate material with ½% Igepon T Gel and 2% hydrosulfite for 10 minutes at 160°F.

(2) Acetate-viscose mixtures: ½% Igepon T Gel for 15 minutes at 140°F.

This process has also proven to be of interest for the dyeing of fast blacks on nylon.

Nylon Dyeing

For the dyeing of nylon piece goods it has been found that by presetting with dry heat unusual dimensional stability is obtainable. This prevents the formation of permanent wrinkles during the scouring, dyeing and finishing. This setting is accomplished by passing the fabric over heated rolls or entered into an enclosed

tenter frame at temperatures as high as 430°F. for a matter of seconds.

Saturated steam is also used for presetting with pressures as high as 15 to 30 lbs. for a period of three to five minutes. Plants that do not have these facilities may subject the material to boiling water for periods of ½ hour to 1 hour depending on the type of fabric being processed.

Acetate dyes have been largely used for nylon due to their excellent levelling and covering properties. However, the fastness properties of this type of dyestuff to light and washing leave something to be desired.

With the use of selected acid, chrome and pre-metallized colors it has to a great extent been possible to produce outstanding fastness properties.

Selected acid colors when used on the covered jig and dyed at the boil with a temperature of 210°F. on the jig roll have produced some very good results.

Stabilized Finishes on Rayon Piece Goods

It is of interest to summarize the recent progress in the stabilization of rayon fabrics; a field which is becoming of increasing importance. The major developments are:

(1) The introduction of urea-formaldehyde and melamine-formaldehyde, which increases the wet strength and decreases the tendency to shrink while giving the well known anti-crease finish.

(2) The use of the formaldehyde reaction to reduce swellability and to increase the wet strength of viscose rayon. Within the past few years glyoxal, a formaldehyde derivative which can be cured readily at high temperatures, has been employed with considerable success. The glyoxal method is known to the trade at Sanforset.

(3) The introduction of the caustic alkali process known as the Definized Process.

For extreme versatility the urea and melamine formaldehyde resins when properly handled produce a wide range of shrink resistable finishes which can be applied to various blends. The method of handling is applied to various blends. The method of handling is similar to the Sanforset Process, but the degree of control is not as great. One of the drawbacks of these resins is the so-called chlorine retention, usually taking place in the process of laundering. The chlorine retained by the resin may tender the goods and cause yellowing of white materials. The new comer in the formaldehyde resin group, which due to its chemical structure can be termed non-chlorine retentive, is acetone formaldehyde. It is applied in practically the same way as urea and melamine. One disadvantage of this product is the tendency to yellow whites during drying and curing operations. However, when properly applied the stabilization and wash fastness are very good.

For the application of the Sanforset or glyoxal process it is essential that the fabric be thoroughly prepared, free of oils and sizes. The cloth is then bleached or dyed with selected direct or vat colors, followed by drying. The material is then treated by padding through a solution of glyoxal with an acid catalyst, dried immediately on a tenter frame at ½" to ¾" over the finished width. It is then necessary to cure this framed material for a short period of time at elevated temperatures, usually on a loop dryer in order to obtain relaxation. To remove surpluhs chemicals it is then advisable to wash slack in rope form with a detergent plus a small amount of alkali. The last operation is to short frame, which in turn removes wrinkles and establishes finished width.

The third method consists of impregnating with protective colloid, drying, and then passing through concentrated caustic soda solutions and neutralizing immediately in a bath containing sulfuric acid or sodium bicarbonate, followed by rinsing. This process, known as Definizing, has been used to good advantage for certain fabric finishes. The material is generally created in the greige state, and the usual scouring, dyeing, and finishing operations should be carried out with minimum tension.

The overfeed pin tenter frame originating in Great Britain is acknowledged to be much superior to that of the conventional clip frame. This machine is being used in the States at speeds up to 80 yards per minute with an overfeed of approximately 15%. This frame is equipped with an automatic guider to feed the cloth to the pins where a balanced air flow delivers air to both sides of the fabric. It is known that the handle of any fabric is improved tremendously by control over dimensions and by the use of this type of dryer. For spun rayons alone or in blends with wool, cotton, or acetate, finishes of excellent textures are produced.

Machinery

New types of automatic jigs have been introduced in the past few years to meet the requirements of piece good dyers. The outstanding features of these machines are:

Automatic reversing (and in one instance automatic stopping with self-acting passage-counter).

Simultaneous drive of both batching rollers.

Practically constant cloth running speed.

Efficient expanders.

Easily attended lever for inexpert operators.

It has also been found that by covering the jig, the normal temperature of 160°F. on the batched roll is increased to as high as 210°F., enabling the dyer to produce finished work free of shaded selvages, such as is found in the light weight acetate sharkskins, acetate taffetas, and nylons. This cover insulates both the batched roll and the space above the dyebath level from the atmosphere, thereby reducing the loss of heat to a minimum.

The use of the dye padder has become of great importance in the modern dyehouse. The possibilities that this type of equipment offers to the dyer of piece goods are the application of direct colors, vat pigment, some acetate colors, sulfur colors and naphthols.

There has been a definite tendency to increase the size of pad rolls and to use stainless steel, rather than rubber, for the bottom roll. Greater degree of control of pressure across the face of the rolls has been attained, as in the microset type of pad. Pad boxes made of stainless steel which are readily cleaned are in general use today. Yarn unevenness or a tightly woven fabric which makes penetration difficult is often padded in the greige, taken to the dyebeck and boiled with the addition of salt. The theory of this application is that pressure of rolls penetrates the color into the fiber, so that when it is treated at the boil in the dyebeck, plus salt, the dyeing takes place on the inside as well as the outside at approximately the same time. In normal beck dyeing this action takes place from the outside in, and on difficult constructions does not always penetrate thoroughly.

The introduction of the duplex dye beck has been an outstanding developbent to the textile industry. The name duplex implies that two dye becks are arranged as one unit. The object of this machine is to treat material in endless rope form over rotating companion reels which rotate in outward direction. The liquor ratio of this type machine is reduced to a lower degree as compared to the conventional reel. The ease of threading, rapid change of temperatures due to lower ratio of liquor, and the minimized damage of fabric due to friction are the principle features. This type of machine is being used for bleaching, washing or dyeing.

We have made mention of continuous rope dyeing followed by vacuum extraction, which is accomplished by taking the wet material from the dyebeck, opening by scutching, and drawing under tension across a pipe with cut in slots using air or steam under vacuum to draw the excess water from the fabric. This type of machine is used to a great extent; how-

ever, it has been found that certain constructions can not be handled in this manner, neither can they be subjected to the ordinary centrifuge extraction. A development that has answered this purpose, and which is not well known to the trade, is a new tensionless vacuum slot extractor. A perforated hollow roller is fitted around the slotted pipe. This roller is driven in such manner that suction extraction can be accomplished without the usual tension employed to draw the material across the suction slots. This machine was developed by a well known finishing plant, and has now been placed with one of the large machine manufacturers for distribution.

The Smith Drum "fountain" or "cascade" machine, which embodies the spindle principle of the Buhlmann machine, represents one of the newer developments in skein dyeing equipment. Instead of moving the yarn through the dye liquor, the dye liquor is pumped through the spindle which holds the yarn. This method is of particular advantage for the dyeing of rayon yarns, because the subsequent winding operation is simplified. The dye liquor in this machine, being pumped through the yarn on the spindle, in effect causes a floating of the yarn in this dye liquor, which then flows down the yarn to the dye box from which it is continuously circulated. No part of the skein is submerged in the dye box liquor. The volume of liquor which is pumped through the yarn can be regulated so that the yarn can be completely surrounded by dye liquor. This regulation practically eliminates the possibility of the yarn coming in contact with the air, and is extremely beneficial in vat color dyeing, wherein the danger of oxidation of vat dyestuffs is practically eliminated. Periodically the position of the yarn on the spindle is changed, without adversely affecting the winding qualities of the yarn.

In both the Buhlmann and the Smith Drum types of equipment, a larger quantity of hydrosulfite for the reduction of vat colors is required than in the older open dye box, in which the yarn is suspended on sticks which are turned by hand. This added expense is, however, easily offset by savings in time and in labor as well as in improved winding qualities of rayon yarn.

Conclusion

In conclusion, we wish to state that there are still many complex problems in regard to the handling of certain fabrics to obtain desired results. However, it has been my purpose to highlight some of the present methods employed that have enabled finishing plants to satisfy the consumers demand for quality production in dyed and finished materials.

Trade Practice Rules —

(Concluded from page P275)

of the more durable type; tests which will determine questions of absorption and repellency when the fabric is made of different kinds or different combinations of fabrics. These are all factors which must be considered.

Another pending proceeding in which test procedures are among matters of major importance relates to the proper descriptive terms for designaitng colorfastness of fabrics. The studies being made are directed to tests which will correctly evaluate washability from the standpoint of colorfastness, and from the standpoint of such color destroying factors as light, perspiration, crocking, gas, etc. Laboratory test methods to support a fair and equitable system of marking which will make it possible reasonably to differentiate between fabrics of better or superior colorfastness from those of lower classification must be considered.

In the Canvas Cover Industry the question of appropriate test methods for tents, tarpaulins, awnings, etc., are highly important to determine the gradations of performance of the product in respect to water resistance, fire resistance, flame resistance, and resistance or protection against mildew. While the fabrics may not be rendered fireproof or *proof* against the passage of moisture or damage from mildew to such extent as to justify the strong implication in the word "proof", nevertheless, finishes and treatments are available which can supply a very substantial and valuable resistance to these contingencies. In fact, the fabrics are finished with different degrees of such resistance. Some finishes are of a more temporary character than others. Some have a superior resistance in comparison with others. Test methods as well as desirable nomenclature are needed which will appropriately evaluate the performance and enable the product to be labeled and advertised in a way that will not be deceptive or misleading but reasonably and fairly in accord with normal conditions of use.

Another pending conference proceeding we have stems from recent developments, particularly since the close of the war, which have brought to the fore the question of proper labeling and advertising in relation to shrinkage control of wool products. The questions involved are receiving careful study in the industry and by us to provide rules which will afford those concerned a fair and equitable guide for labeling and advertising. The test methods for correctly evaluating the effects of washing, drycleaning, or other conditions which the consumer experiences in use of the garments are needed. I am happy to say that the industry technicians are earnestly working with us on the problems and the proceeding is now far enough advanced to give reasonable assurance that a desirable solution will be reached in the near future.

Without going further, the pending proceedings I have cited will, I believe, serve quite well to illustrate the extent to which test procedures and laboratory work are important to matters of fair trade practice rules.

We are all interested in good testing methods. The test method should be one that is fair and equitable to all concerned, avoiding things that may lead to unjust discrimination. The testing procedure should be one that will provide a realistic index to or evaluation of actual conditions to which the product will be subject in normal use by the consumer. No better illustration on this point can be had than that pertaining to the subject of washability. It matters little whether a fabric will withstand a certain type of washing in the laboratory unless that type of washing has a reasonable relationship to the washing normally expected to be applied by the consumer. A good test method should also embody the maximum of simplification and ease of application from the standpoint of equipment needed, time required, or other expense involved. While it is true certain test methods do require considerable time and equipment, these elements, to the fullest extent possible, should be reduced without sacrifice of substantial accuracy of results. And, as a final qualification, I believe that in so far as practicable, a good test method should be one that can be readily explained and understood as a reliable index.

We are happy to avail ourselves of the vast fund of information the industry groups place at our disposal. We are also happy to utilize in the application of rules appropriate test methods devised by such outstanding scientific organizations as the AATCC.

I am grateful to you for your research and effort which you bring to bear on progressive and forward looking testing. The scientific work of your organization, with which I am somewhat acquainted, has beyond question meant a lot to the welfare and progress of the textile industries. It has meant a lot to the buying and consuming public. Let me say you are to be congratulated in this technicological service. You have earned the right to take just pride in the thought of having served the public good.

Book Reviews

Source Book of Personnel Forms

A Manual for Improving Personnel Administration. Published by the National Foremens' Institute, 1948, Deep River, Connecticut. Price $7.50.

The question in every company—small, medium, large—is no longer "shall we maintain complete personnel records"—but "which are most useful for our purposes". The answer lies in proper selection. There are probably almost as many variations of personnel forms as there are personnel departments. Some companies are top-heavy with paper personnel procedures. They have five forms where one will do. On the other hand, there are organizations which suffer from a severe case of personnel form anaemia.

The purpose of this book then, is to provide the personnel administrator with a convenient measuring rod, a comparison checklist through which he can whittle away some of his forms if they are outmoded, and add others where current trends and developments indicate additions or changes are necessary.

The book includes around 200 different record forms, which cover the following:—

Absentee Records by Department.
Absence Records on Individual Employees.
Accident Reports.
Application—Pre-Hiring Forms.
Application Forms.
Change of Address.
Change of Status.
Employment Contracts.
Employee Requisitions.
Grievance Forms.
Hiring Notices.
Identification Cards.
Induction Forms.
Job-Posting Notices.
Layoffs.
Leave-of-Absence Forms.
Merit-Rating Forms.
Merit-Rating Forms—Foremen and Executives.
Merit-Rating Forms — White-Collar Workers.
Overtime Authorization.
Permanent Record Forms.
Physical Examination Forms.
Probation Periods.
Promotion Forms.
Reference Forms.
Reinstatement Forms.
Seniority Forms.
Suggestion Forms.
Tools.
Turnover.
Transfers
Termination Reports.
Vacation Cards.
Warning Notices.

Physical Aspects of Colour

An Introduction to the Scientific Study of Colour Stimuli and Colour Sensations, by Dr. P. J. Bouma, Philips Research Laboratories, Eindhoven (Netherlands), 312 pages, 113 figures with an appendix of tables and bibliographies. Format 6½ by 9¼.

Published by (Philips Industries) Eindhoven (The Netherlands) 1947.

This is one of a number of books written by the Philips' technicians and scientists on technical and scientific subjects but this is the first book to be published in English.

The subject of color lies on the boundary of various pure and applied sciences, including physics, physiology, illuminating engineering and chemistry, and in practice has much to do with textile design, and art in general. As a result color may be treated from quite different points of view. An ideal treatment of the subject should consider all of these different points of approach. Were this done the book would become extremely large. The author has therefore restricted himself to the two phases with which he is most familiar namely experimental physics and illuminating engineering.

The book is intended for all persons interested in the origin and measurement of colors such as students of physics, illuminating engineers, and technicians, but the author hopes that it will also prove of value to biologists, physicians, and those having to do with dyes and colored products in general.

The purpose of the book is to survey the theory of colorimetry and its application to practical problems, to enable the reader to carry out the calculations occurring in practice, to facilitate his study of professional literature and to hand him the tools necessary for a deeper study of other aspects of the color problem.

Handbook of Chemistry and Physics

Thirtieth Edition. Charles D. Hodgman, M.S., Editor-in-Chief. Published by Chemical Rubber Publishing Co., 2310 Superior Avenue, N. E., Cleveland, Ohio. 2686 pages. Price $6.00. Special Rates to Teachers and Students.

Previous editions of this handbook are so well known that in most instances the present new edition needs no introduction. The general features and scheme of arrangement which have received extensive endorsement in previous editions have been retained.

Special consideration has been given to all requests and suggestions that have been received since the publication of the previous edition. Tables originally occupying over one hundred pages have been more or less completely revised, and in all this thirtieth edition includes about one hundred and forty pages of new material.

To those interested in atomic and nuclear physics one of the most useful changes will probably prove to be the replacement of several separate tables giving information concerning isotopes and radioactivity by a recent single compilation listing the properties of all artificial and natural radio active isotopes and stable isotopes. More complete and recent data have thus been made available in a single table.

The growing importance of synthetic rubber is reflected by the addition of a new table giving a large range of physical properties of natural and synthetic rubber stocks.

This volume provides a very complete reference book regarding both chemistry and physics. The table of chemical properties of both inorganic and organic compounds is very complete. Forty-one different authors have collaborated with Prof. Hodgman in its preparation. It represents by far the best and most complete edition which has so far been published.

The Identification of Textile Materials

Tentative Textile Specification No. 13, 1948. Published by The Textile Institute, 16 St. Mary's Parsonage, Manchester 3. Price 5/.

This pamphlet is the result of the work of the Institute's Unification of Testing Methods Committee on the above subject, with which it deals comprehensively. It describes a technique for the identification of all of the common textile fibers both natural and manufactured. It contains 48 excellent photo micrographs of 24 different fibers showing both longitudinal and cross sections of each. The text is accompanied with three extensive folding tables: *Table A*, Preliminary Analysis of Fibers (Without the use of the microscope) indicated as Scheme A. *Table B*, Preliminary Analysis of Fibers (With the aid of microscope) indicated as Scheme B, and *Table C*, Analytical Scheme for the Identification of Textile Fibers.

1948 ASTM Standards on Textile Materials

560 pages. Price, $4.35. Published by American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa.

The October, 1948, edition of "ASTM Standards on Textile Materials," include in their latest form 86 specifications, test methods, and tolerances developed by Committee D-13 on Textile Materials. Considerable other related material is given.

Of the standards 26 cover cotton; 10 pertain to rayon and silk; 11 cover wool; six cover asbestos; six pertain to glass; and four come under the heading, bast and leaf fibers. The balance of the standards are general testing methods, definitions, etc. Some of these cover testing machines, definitions of terms (an extensive list is covered), fire-retardant properties, air permeability of textile fabrics, interlaboratory testing, resistance to water and insect pests, quantitative analysis, determining small amounts of copper, manganese, and nickel, determining relative humidity, and many more.

There are also included in this publication a number of appendices covering the following: basic properties of textile fibers; yarn number conversion table; proposed recommended practice for designation of yarn construction; psychrometric table for relative humidity; proposed recommended practice for calculating number of tests to be specified in determining average quality of a textile material; proposed test for accelerated aging of textiles; proposed test for estimating the clean wool content in wool in the grease; proposed test for evaluation of properties related to the hand of soft-finished woven fabrics; and proposed specification and method of test for fire-retardant properties of treated felt. There are also included convenient tables of contents (by subject and by ASTM serial designation), and in index of methods of test.

Another feature of this publication is a section with several papers presented before Committee D-13 on Textiles.

High-Polymer Physics

A symposium edited by Dr. Howard A. Robinson, Manager, Research Laboratories, Armstrong Cork Company, under the auspices of the American Institute of Physics. 572 pages, numerous illustrations and diagrams and an extensive bibliography. Published by Chemical Publishing Co., Brooklyn, N. Y. 1948.

This book is a symposium of articles by 39 different authors, all authorities upon the subjects regarding which they write, all related in some way to the relatively new subject of high-polymer physics.

Individual articles are devoted to the molecular structure, physical and physicochemical properties of natural and synthetic high polymers, e.g., glass, cork, rubber, textiles, certain plastics, synthetic resins, and synthetic rubbers. The last part deals with scientific instruments used for making determinations and carrying out tests. Among the properties investigated are the mechanical, electrical, viscosity, dielectric thermal, elastic, stress strain, crystallization tackiness, electrostatic, swelling and thermodynamic characteristics of certain high polymers.

The results discussed come largely from industrial research laboratories rather than from college research groups. The physicist had to help the chemist and vice-versa to explain the phenomena encountered in high-polymers. The volume is the product of their cooperation.

Papers Delivered at the First Canadian Textile Seminar

Queens University, Kingston, Ontario, September 17-18, 1948. Sponsored by The Textile Technical Federation of Canada.*

A series of 31 papers delivered at The First Canadian Seminar, accompanied by numerous tables and illustrations. The committee in charge is to be congratulated upon the wealth of textile information which was made available at this seminar.

Subjects of papers and authors are as follows:

"Present Day Fibers and Future Possibilities," W. J. Buck.

"Rewound Filling Compared to Ring Spun Filling," V. Duxbury.

"Cotton Fiber Qualities," R. W. Kolb.

"Cotton Opening, Picking and Card Room Processes," J. R. Dunkerley.

"New Developments in Cotton Spinning Practices," R. Massey.

"Cloth Construction and Fabric Analysis," W. J. Sullivan.

"Advanced Methods of Automatically Controlling Cotton Slashers," G. B. Lint.

"The Use of Nylon Staple on the Woolen and Worsted Systems," R. D. Bennett.

"The Necessity for Improved Fiber Control in Worsted Spinning for Possible Elimination of Processes and Improvement of Quality," W. Hodgson.

"Ring Versus Mule Spinning in the French System," H. P. Smith.

"Pin Drafting and Its Application to the Worsted and American Spinning System," R. N. Baird.

"An Analysis of Some Unusual Rayon Fabric Defects," T. Grindley.

"Laboratory and Service Evaluation of Wear Resistance of Man-made Fibers," J. R. Stewart.

"Fiber Bonding of Rayon Yarns and Cords," C. E. Coke.

"The Influence of Mixed Fibers on Yarn and Fabric Design," R. Wood.

"Filament Denier Factor in Nylon Fabrics," I. D. Vessie.

"Package and Beam Dyeing of Spun Viscose," W. W. Graham.

"Rot Resistance of Textiles," C. H. Bayley.

"Remote Control of Dyeing Cycles," F. D. Wallace.

"Dyeing of Synthetic Fabrics," A. Greyborn.

"Cotton Finishing," E. Sewell.

"pH Control in Wool Processing," W. E. Prentice.

"Quality Control in Hosiery Manufacture," W. H. Starling.

"Processing of Water for Textile Mills," E. J. Buckley.

"Air Conditioning for Viscose Rayon Manufacture," J. Morris and F. R. Leggett.

"Air Conditioning and Its Relation to the Modern Textile Mill," G. L. Wiggs and L. C. A. Walford.

"Tailoring Humidification to an Existing Textile Mill," H. P. Williams.

"Materials Handling," G. T. Moore.

"Integral—A New Numbering System for Yarn, Cloth and Rope," S. Blackshaw.

The Chemical Technology of Dyeing and Printing. Vat, Sulfur, Indigosol, Azo and Chrome Dyestuffs and Their Auxiliaries

By Louis Diserens, Technical Director of Alsatian Print Works, Scheurer-Lauth & Co., Thann. Translated and Revised from Second German Edition by Paul Wengraf and Herman P. Baumann. 500 pages. Published by Reinhold Pub-

* A few copies of this publication are available, as long as they last at $3.00 a copy. Apply to Henry K. Torpey, 77 Moncton Ave., Quebec City, Canada.

lishing Corp., 330 West 42nd Street, New York 18, N. Y. Price, $11.00.

The rapid developments of the dye industry since the turn of the century has had parallel growth in the technique of dyeing and printing of textiles. Since then most of the important developments connected with the insoluble azo dyes, and all of the vat dyes except vegetable indigo, have been introduced, also the formaldehyde-sulfoxylates.

The so-called textile chemical auxiliaries which have done so much toward improving processes and results obtained in the boil-off, bleaching, dyeing, printing and finishing of textile materials, have been largely developed during this same period.

It is with the chemical composition, properties, and methods of preparation of these twentieth century products that the author principally deals. While methods of application are frequently given, no attempt is made to describe the mechanical appliances used in dyeing and printing.

Following an interesting and instructive introduction, the text is covered in five chapters as follows:

I. Vat Dyestuffs
- Preparation of Dyestuff Pastes and Fine Powders
- Application Printing with Indigo
- Vat Color Printing Methods
- Discharge Printing of Vat Colors
- Resist Printing of Vat Colors
- Dyeing with Indigo
- Dyeing with Vat Dyestuffs
- Table of Auxiliaries for Vat Dyestuffs.

II. Sulfur Dyestuffs
- Preparation of Pastes and Fine Powders
- Dyeing and Printing with Sulfur Dyestuffs
- Table of Auxiliaries for Sulfur Dyestuffs

III. The Indigosols
- Printing and Dyeing Methods with Indigosols
- Table of Auxiliaries for Indigosols

IV. The Insoluble Azo Dyestuffs
- Dyeings and Prints Based on Impregnation
- Special Dyestuffs Incorporating Both Naphthol and Base
- Table of Coupling Components
- Table of Fast Color Salts and Bases
- Table of Auxiliaries Used in Preparing Azo Dyes for Dyeing and Printing

V. Mordant Dyestuffs
- Types of Mordants
- Mordant Dyestuffs on Vegetable Fibers
- Mordant Dyes on Animal Fibers
- Table of Metal Salt Mordants
- Table of Fatty Mordants
- Table of Auxiliary Agents for Mordant Dyestuffs

In the preface, the translators state that many references which were not available to their European colleagues have been added, and some facts, less important because of their limited industrial value, have been abridged.

Wengraf and Baumann are to be complimented for their excellent work in translating this valuable book and should be thanked for making the text available in English.

Technique of Organic Chemistry Volume II

Three sections:

I Catalytic Reactions by V. I. Komarewsky and C. H. Riesq of the Illinois Institute of Technology.

II Photochemical Reactions by W. Albert Noyes, Jr., and V. Boekelheide of the University of Rochester.

III Electrolytic Reactions by Sherlock Swan, Jr., of the University of Illinois.

In all 219 pages—63 figures and 2 tables. Published by Interscience Publishing Co., 215 Fourth Ave., New York 3, N. Y. Price, $5.00.

The fundamental object of this series is to present in a comprehensive way the techniques which are used in organic laboratories and which are available for the investigation of organic compounds.

The authors give the theoretical background for an understanding of the various methods and operations and describe the techniques and tools, their modifications, their merits and limitations and their handling.

Electrolytic and photochemical reactions have been used for a long time in preparative organic chemistry, but it is believed that they might find a much wider application if the details of their use were properly brought to the attention of organic laboratory workers. It is believed that this book will do much to encourage the use of these valuable laboratory procedures.

Elsevier's Encyclopedia of Organic Chemistry

Volume 12A, E. Josephy and F. Radt, editors, XXVII + 1262 pages. Format 6½ by 9¾ inches. Elsevier Publishing Co., Inc., 215 Fourth Ave., New York. 1948. Subscription price, $78. Serial Price, $91. Single volume price, $104.

Bicyclic carboisocyclic compounds are dealt with in Volume 12, but owing to the enormous number of compounds with naphthalene skeleton the volume is divided into two parts. Volume 12A, includes all bicyclic compounds except those with a naphthalene skeleton which are contained in Volume 12B.

The style of this volume follows that of its two predecessors (Volume 13 and 14). The same completeness and excellent arrangement of compounds lends to its usefulness.

The only real measure of comparison of this work is Beilstein which covers a similar encyclopedic arrangement of organic compounds. One great advantage over Beilstein to American users is the fact that it is published in English.

A general outline of the planning of the encyclopedia, and suggestions to facilitate its use with a complete list of abbreviations, is published at the beginning of the volume, also a complete list of all publications to which reference is made.

At the end of the volume there are very complete and excellent subject and formula indices.

The development of our knowledge of the various branches of natural science, has taken organic chemistry out of a somewhat isolated position, and has brought it into a closer relationship with physics and biology. As a result organic chemistry has become of interest not only to those working along chemical lines alone, but for physicists, biologists, and medicinal chemists. The great advances in industrial chemistry, as for instance the development of man made fibers, and plastics, to say nothing of dyestuffs has increased the application and usefulness of organic chemistry in recent years.

This Encyclopedia of Organic Chemistry will prove of great assistance to organic chemists and should be looked upon as an essential addition to every organic research laboratory.

Neueste Fortschritte und Verfahren in der chemischen Technologie der Textile fasern. Zwerter Teil

Neue Verfahren in der Technik der Chemischen Veredlung der Textilfasern (Hilfsmittel in der Textilindustrie). By Louis Diserens. Volume I. 727 pages. Published by Verlag Birkhäuser, A.G., Basle, Switzerland. 1948. Price, 87.50 Swiss francs.

This volume is the second of a series in which the author endeavors to bring all of his material previously published in French about ten years ago, up to date with extensive additions of current interest, and includes data up to June, 1947. Volume I, Part I, published in 1946 deals with the Chemical Technology of Dyeing and Printing.* Part II deals with the general treatment of fibers other than dyeing and printing, and covers the preliminary treatment of fibers such as sizing, scouring and bleaching.

Chapter I (119 pages) is devoted to the vegetable fibers, and is divided into two

* Volume I, Part I, has recently been translated into English by Wengraf and Baumann, review of which appears in this edition of the Reporter.

sections, one dealing with sizes and the other the chemistry of desizing agents including enzymes. This chapter also deals with various retting processes. The immunization of cellulose fiber is also described.

Chapter II (220 pages) is devoted to the treatment of wool, and covers such subjects as washing, scouring, and processes for degreasing wool, chlorination, carbonization, milling, felting, weighting, immunizing, and wool damage.

Chapter III (37 pages) deals with silk fiber, and the processes of degumming and weighting.

Chapter IV (223 pages) deals with the bleaching of all textile fibers, and describes with considerable detail the use of hypochlorites, sodium chlorite, peroxides, ozone, persalts and permanganate. Variations of the bleaching process as applied to flax, hemp, jute, rayon, nylon and wool are described.

Chapter V (46 pages) describes the action of alkalis on cotton, and covers the mercerizing process and the use of certain mercerizing assistants.

Chapter VI (56 pages) discusses the action of acids on cellulose and the various stages of degradation that takes place.

This book not only covers the subjects enumerated above, but goes into considerable detail concerning the various textile chemical auxiliary compounds used in the processing of textiles, their composition and chemical action during use.

TRADE NOTES • NEW PRODUCTS

• Meeting, LTI Alumni Association, N.Y. Chapter

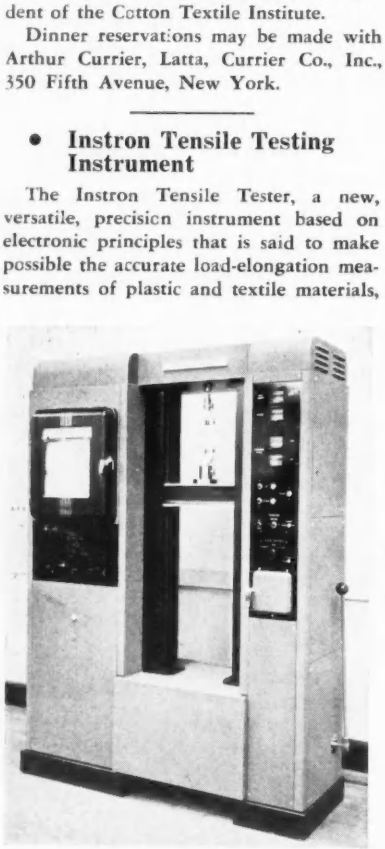
A meeting of the New York Chapter of the Lowell Textile Institute Alumni Association will be held on the evening of April 6th at the National Republican Club on 40th Street in New York. A social hour is scheduled for 6:00 P.M. to be followed by a dinner at 7:00 P.M.

Speakers for this occasion will be Henry F. Herrmann, President of the American Association of Textile Chemists and Colorists and Dr. Claudius T. Murchison, President of the Cotton Textile Institute.

Dinner reservations may be made with Arthur Currier, Latta, Currier Co., Inc., 350 Fifth Avenue, New York.

• Instron Tensile Testing Instrument

The Instron Tensile Tester, a new, versatile, precision instrument based on electronic principles that is said to make possible the accurate load-elongation measurements of plastic and textile materials, wire, paper, rubber, adhesives and similar speciments, is being produced by the Instron Engineering Corporation, 2 Hancock Street, Quincy 71, Mass.



Instron Tensile Tester

Full scale load range of the unit extends from 2 grams up to 5000 pounds, in some models, representing a spread of approximately a million to one, and a choice of jaw speeds is incorporated ranging from 0.02 to 20 inches per minute. By virtue of the flexibility of the controls, both for changing the sensitivity of the load recording system and for operating the motion of the pulling jaw, a variety of unique testing techniques is available for the determination of special properties, as well as for routine measurements.

A descriptive bulletin is available upon request.

• Calgon Appointments

Dr. Thomas H. Daugherty has been named assistant director of research for Calgon, Inc., Pittsburgh.

D. J. Erickson, president of Calgon and affiliated companies, simultaneously announced appointment of C. E. Kaufman as assistant director of chemical research, Hall Laboratories, Inc.

Dr. Everett P. Partridge, Hall-Calgon research director, explained that Dr. Daugherty will be in immediate charge of research and development projects, serving as coordinator of development work in the application of "Calgon," the sodium phosphate glass, and other products of the company in various uses. Calgon is extensively used in leather, paper and textile processing, in domestic, industrial and municipal water treatment and as an ingredient of various compounds for specialized tasks.

• Booklet on Rayon Spinning

H. W. Butterworth & Sons Company, Philadelphia, Pa., manufacturers of rayon spinning machinery and textile finishing machinery, announce the publication of a 12-page booklet entitled, "Butterworth Rayon Spinning." This booklet, with a uniquely-attractive godet wheel cover design, is the first of its kind published by the company and describes in detail the latest Butterworth 100 spindle type rayon pot spinning machine.

A brief history of the development of rayon spinning machinery is related in the opening pages of the booklet, narrating Butterworth's part in the technical development in this field. Butterworth's engineering facilities and its research and development department are described.

The booklet covers every important unit of the Butterworth machine. Important mechanical features such as the patented Traverse Drive system are described and discussed in detail and shown in photo close-ups.

The last portion of the booklet is devoted to description of Butterworth's foundry, manufacturing, machining and shipping facilities, and numerous production improvements initiated since the end of World War II. A copy of this booklet can be obtained by requesting it on a company letterhead and addressing it to Rayon Machinery Division, H. W. Butterworth & Sons Company, Philadelphia 25, Pa.

• Honorary Member, AIC

Dr. M. L. Crossley, a director of Research for the American Cyanamid Company, has received an honorary membership in the American Institute of Chemists in recognition of his work in the field of chemistry. The presentation was made at a joint meeting of the New Jersey Chapter of the A.I.C. and the North Jersey Section of the American Chemical Society on February 14 at the Hotel Winfield Scott, Elizabeth. August Merz, a research advisor and consultant for the American Cyanamid Company and one of their half-century employees, presented Dr. Crossley to the president of the A.I.C., Lawrence H. Flett made the award.

Dr. Crossley, who recently received the honorary degree of Doctor of Science from Wesleyan University, Middletown.

Conn., was awarded the 1947 gold medal of the A.I.C. for "noteworthy and outstanding service to the science of chemistry and the profession of chemist". He has taken a leading part in research on the relation of molecular structure to color in organic compounds; in the synthesis of dyes; in the discovery and industrial development of the sulfa drugs and in a fundamental study of the chemistry of infectious diseases, especially the changes in certain constituents of the blood during pneumonia, and in the chemotherapy of cancer.

Dr. Crossley was twice elected to the presidency of the American Institute of Chemists and was chairman of its Committee on Professional Education in 1932. The recommendations of this Committee received wide acceptance among educational institutions which give courses in chemistry.

• Elected Director, TRI

At the regular monthly meeting of the Board of Directors of Textile Research Institute, Inc., February 3, 1949, Dr. Norman W. Armitage was elected a Director of the Institute. The election of Dr. Armitage to the board fills a vacancy caused by the resignation of Daniel B. Curll of Solvent Products Corp., whose duties away from New York City now occupy a major portion of his time.

Dr. Armitage is well known among textile scientists. He is President of the Deering Milliken Research Trust, which is located at Greenwich, Conn., and is one of the active members and supporters of the Textile Research Institute, Inc. Prior to his becoming President of the Deering Milliken organization in November, 1948, he was chief patent counsel and Vice-President since early 1946.

• Officers, Soap and Glycerine Producers

Charles Luckman, President of Lever Brothers Company, Cambridge, Mass., was elected President of the Association of American Soap & Glycerine Producers, Inc., at its twenty-second annual convention meeting at the Hotel Commodore, New York, on January 26th. He succeeds G. A. Wrisley, Vice-President of the Allen B. Wrisley Company of Chicago.

At the same meeting, N. H. McElroy, President of Procter & Gamble Company, Cincinnati, was elected Vice-President for the Mid-West.

Re-elected to their posts were the following officers: E. M. Finehout, Vice-President, of the Los Angeles Soap Company, as Vice-President for the Far West; Edward H. Little, President of the Colgate Palmolive-Peet Company, Jersey City, as Vice-President for the East; Nils S. Dahl, General Manager, John T. Stanley Company, New York, as Treasurer of the Association.

The Association also elected five new directors: J. L. Brenn, President, Huntington Laboratories, Huntington, Ind.; H. Dock, President, M. Werk Company, Cincinnati, Ohio; B. F. Flynn, President, Pacific Soap Company, Los Angeles; E. B. Hurlburt, President, J. B. Williams Company, Glastonbury, Conn.; and N. H. McElroy, President, Procter & Gamble Company, Cincinnati, Ohio.

These following directors of the Board of Fifteen were re-elected: N. S. Dahl, General Manager, John T. Stanley Co., New York; L. J. Evans, Vice-President, Iowa Soap Company, Burlington, Iowa; E. M. Finehout, Vice-President, Los Angeles Soap Company, Los Angeles; D. M. Flick, Vice-President, Armour & Company, Chicago; G. F. Fulton, President, Beach Soap Company, Lawrence, Mass.; E. H. Little, President, Colgate-Palmolive-Peet Company, Jersey City, N. J.; Charles Luckman, President, Lever Brothers Company, Cambridge, Mass.; E. A. Moss, Vice-President, Swift & Company, Chicago; R. H. Young, President, Davies-Young Soap Company, Dayton, Ohio, and G. A. Wrisley, Vice-President, Allen B. Wrisley Company, Chicago.

• du Pont Rayon Personnel Changes

Eight personnel changes in the research, sales, and technical service sections of three divisions of the Rayon Department have been announced by E. I. du Pont de Nemours & Company.

Dr. Frank K. Signaigo, assistant director of the Pioneering Research Section at Buffalo, has been made director of the Acetate Research Section, succeeding Dr. W. W. Heckert, who recently became assistant manager of the Rayon Technical Division.

Dr. Robert M. Hoffman, manager of the Pioneering Research Section, becomes assistant director there. Henry C. Froehling, manager of the Development Section of the Rayon Technical Division, has been transferred to the Acetate Division as New York district sales manager of "Orlon" acrylic fiber. Mr. Froehling succeeds Charles M. Wenrich, previously named district sales manager for acetate rayon yarns in the New York district.

Succeeding Mr. Froehling as manager of the Rayon Development Section will be Dr. Donald F. Holmes, now field research supervisor. D. M. Thornton, III, group leader, has been named field research supervisor.

W. David R. Straughn, district sales manager in the Providence office of the Rayon Division, is transferred to the Acetate Division in Wilmington as manager of the Technical Service Section. He has been succeeded by Henry G. Buckley as district sales manager of the Rayon Division at Providence. Millard G. Gamble, III, of the Rayon Division's Charlotte, N. C., office, has been appointed district sales representative in charge of rayon sales at Providence, succeeding Mr. Buckley.

• Seek Purer Metal Solutions

Four student chemists in the Graduate Department of Chemistry at Clark University in Worcester, working under the direction of Dr. Arthur E. Martell of the faculty, are conducting a research project involving the synthesis and study of a new series of chemical substances for altering the properties of metal solutions. The students are Albert E. Frost, of East Douglas, Stanley Chaberek, Richard C. Brown and Robert C. Plumb, all of Worcester. All are ex GI's with overseas service and all are seeking higher degrees in chemistry.

Dr. Arthur E. Martell

The project is being supported in part by grant of funds, chemicals and equipment by F. C. Bersworth, who pioneered the industrial development of aliphatic poly amines and their chelating amino acid salts and derivatives. Bersworth is president of the Bersworth Chemical Company of Framingham, Mass., producers of this type of sequestering and chelating agent for industry.

The new substances under study offset the undesirable properties of certain metals which occur as impurities in water and in many commercial preparations including liquid soaps, fats, oils, emulsions, sanitizing agents, drugs, food products, textile and metal processing.

• IRI Winter Meeting

Industrial Research Institute, Inc., held its winter meeting at the Westchester Country Club, Rye, N. Y., February 2-4. One hundred and seventy research executives from member companies and their guests attended.

Management's view of industrial research was presented in several addresses by top executives drawn from sales, manufacturing, finance and top management and discussed at length in round-table conferences which followed. In addition Dr. James Killian, President, Massachusetts Institute of Technology, spoke on industrial research from the university's viewpoint emphasizing the benefits and hazards of industry-sponsored research in educational institutions.

The plans under study by the Research and Development Board, National Military Establishment, for mobilizing science in the event of an emergency were the subject of a talk by J. T. Connor, member of the committee which developed these plans.

A session was devoted to organization and methods of research in the biological field where nature introduces variables that must be controlled for scientific results. The cost of research and the junior professional's view of his job were the subjects of concurrent round-table sessions which concluded the meeting.

• Monsanto Booklet on Plasticizers

Monsanto Chemical Company, St. Louis 4, Missouri, announces the publication of a booklet entitled "Monsanto Plasticizers". It presents a thorough and informative discussion of the subject and copies are available to users of plastics and plasticizers who request it on their letterhead.

• Celanese Appointment

Anthony A. Williams has been named Assistant Director of the Product Development Department of the Chemical Division of Celanese Corporation of America. Mr. Williams has directed Market Research in the Chemical Division since September 1, 1946, and will continue as head of market research and analysis as well.

Prior to World War II service in the Royal Air Force, Mr. Williams was associated with General Petroleum Company and Shell Oil Company.

• Leeds & Northrup Catalog

Leeds & Northrup's complete line of Speedomax instruments . . . indicators, indicating recorders, and recording controllers . . . is described and illustrated for the first time in a new 44-page catalog.

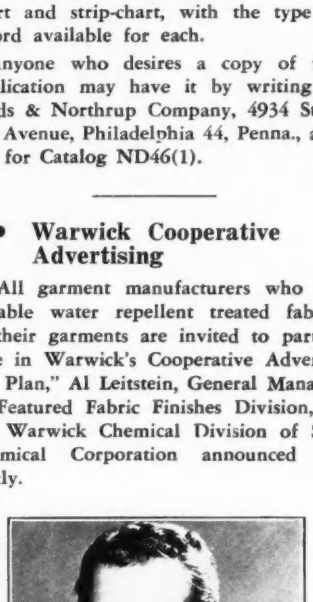
Called "Speedomax Type G Instruments", the publication describes these high-speed, high-sensitivity instruments for all the uses for which they are now available. The pyrometers listed are supplied for measuring temperature with thermocouples, Rayotubes or Thermohms. Other Speedomax instruments listed are those for recording speed and load. The recording controllers are offered for two-position control or are integral parts of full-proportional control systems—either *Speedomax Electric Control,* Position-Adjusting Type for regulating valves, vanes or dampers; Duration-Adjusting Type, primarily for electrically-heated units—*Speedomax Pneumatic Control*, a new and advanced system for air-actuated valves.

Illustrations in the catalog include: close-ups showing design features; schematic diagrams of the Speedomax potentiometer and Wheatstone bridge circuit; and full-size, full-color sections of a round chart and strip-chart, with the type of record available for each.

Anyone who desires a copy of this publication may have it by writing to Leeds & Northrup Company, 4934 Stenton Avenue, Philadelphia 44, Penna., asking for Catalog ND46(1).

• Warwick Cooperative Advertising

"All garment manufacturers who use durable water repellent treated fabrics in their garments are invited to participate in Warwick's Cooperative Advertising Plan," Al Leitstein, General Manager of Featured Fabric Finishes Division, of the Warwick Chemical Division of Sun Chemical Corporation announced recently.



Al Leitstein

The plan is designed to aid all garment manufacturers in their advertising and promotional campaigns provided they purchase and make use of Durable Norane or Durable Norane W treated fabrics in their garments and advertise this fact.

All manufacturers abiding by the plan's simple controls will be granted an advertising credit of ¼ cent per yard on goods up to about 42" wide and ½ cent per yard on goods up to about 54/60" wide. Advertising credits are given for fabrics purchased and processed after January 1st, 1949. Sums earned may be used immediately or may be allowed to accumulate.

In addition, Durable Norane hang-tags and labels are given free of charge to the manufacturers to use on their garments.

• Booklet On Hercules CMC

Considerable new information on the physical properties of Hercules CMC, cellulose gum, is included in a revised technical booklet on this chemical, which has just been released by Hercules Powder Company.

• Mathieson Acquires Standard Phosphate

At a meeting of stockholders of Standard Wholesale Phosphate & Acid Works, Inc., held in Baltimore on March 1, a total of 138,277 shares voted to accept common stock in Mathieson Chemical Corporation on the basis of 225,000 shares of Mathieson for the 150,000 shares of outstanding Standard stock. Mathieson acquires all of Standard's assets in consideration of assumption of its liabilities, according to an announcement by Thomas S. Nichols, Mathieson president. A total of 143,608 shares of Standard stock were represented at the meeting.

Standard Wholesale Phosphate produces sulfuric acid, superphosphates and mixed fertilizers. Its Baltimore plant and properties iuclude several recently installed units for the manufacture of sulfuric acid, said to make it one of the largest sulfuric acid plants in the world. It has well equipped docking and loading facilities for ocean shipment.

Mathieson, which recently announced the acquisition of Southern Acid & Sulphur Co. operating in the southwest, now has a similar business on the eastern seaboard, Mr. Nichols pointed out. In addition to acquiring production and shipping facilities, he said, the Standard transaction will enlarge Mathieson's sales territory for sulfuric acid and fertilizers and provide a new location for the company's chemical developments.

• Convention of Phi Psi

The 1949 convention of Phi Psi, national textile fraternity, will be held at the Biltmore Hotel, Atlanta, Georgia, May 6-7. The Phi Psi student chapter at the Georgia Institute of Technology and the Atlanta Alumni chapter of Phi Psi will act as hosts for the occasion.

Phi Psi, which has approximately 4,000

student and alumni members, was founded at the Philadelphia Textile Institute in 1903 for the advancement of textile engineering.

Elaborate plans are being made in Atlanta for the forthcoming convention under the leadership of Convention Chairman Fred Williams, general superintendent of Piedmont Cotton Mills, and Frank B. Williams, Jr., of Lanett, Ala., who is president of the Georgia Tech chapter of Phi Psi.

In addition to Chairman Williams of Piedmont, other active alumni who will work with the Georgia Tech chapter in making the convention outstanding are James I. Teat of Whittier Mills; Alex Fife and W. C. Gibson of Scottdale Mills; A. Kempton Haynes of Rohm & Haas; George D. Ray of Southern Mills; and J. W. McCarty of Georgia Tech.

Student chapters of Phi Psi, each of which will have representatives at the convention, are located at: Philadelphia Textile Institute, New Bedford Textile Institute, Lowell Textile Institute, Bradford Durfee Technical Institute, North Carolina State College, Georgia Institute of Technology, Clemson College, Texas Technological College, and the Alabama Polytechnic Institute.

Active alumni chapters are located in Boston, New York, Philadelphia, Providence, Chicago, Fall River, Greenville, Charlotte, Albany, New Bedford, Atlanta, and the Chattahoochee Valley.

• Rodney Hunt Campaign

Rodney Hunt Machine Company, Orange, Mass. takes advantage of the fact that "finish" means one thing in the textile industry and something else again in the racing world by linking the two types of finishes together in its 1949 trade paper advertising.

A series of four-color inserts titled "Famous Finishes" will tell how Rodney Hunt textile machinery helps some of the nation's leading textile concerns obtain the finishes they want on the fabrics they produce. Illustrations for the series depict the finishes of a number of the most famous sailing races on record.

The reverse side of the inserts carries a newsletter from the firm, with items of interest concerning new machines for its line, improvements on existing models, and new methods and processes. The newsletter is called "Finishing for Profit."

Oil paintings of the racing finishes are being done for Rodney Hunt by Ben Stephenson, noted portrayer of sailing vessels. His first canvas shows the close finish of the last Fishermen's International Race at Gloucester in 1938.

The inserts are appearing in AMERICAN DYESTUFF REPORTER and other publications.

Ben Stephenson, Noted Painter, at Work on One in the Series of Rodney Hunt Paintings.

• Joins Max Van Pels

Irving Colbert, formerly with Tern Incorporated, is now Domestic Sales Representative for Max Van Pels, Importers and Exporters of drugs, herbs, gums, spices and chemicals, with offices at 441 Lexington Avenue, New York City.

• TRI Resolutions

The Board of Directors of the Textile Research Institute recently released the text of resolutions expressing the gratitude of the Institute to Arthur Besse, President of the National Association of Wool Manufacturers, and to J. B. Wilson, Secretary of the Wyoming Wool Growers Association, for their efforts in forwarding the program of wool research recently inaugurated at the Institute.

The resolution addressed to Mr. Besse particularly emphasizes his cooperation in bringing the research program to the attention of the members of his organization and recommending their participation.

The resolution directed to Mr. Wilson expresses the appreciation of the Institute at his "untiring and effective efforts to forward research into the properties and potentialities of wool."

"The assistance of Mr. Wilson has been particularly effective," the resolution declares, "in bringing to a successful conclusion the internationally sponsored four-year program of fundamental research into the chemical and physical properties of wool which is based at the Textile Research Institute. His cooperation has done much to help initiate this program which we believe will increase the use values of all grades of wool thus stabilizing and increasing markets for raw wool and all wool products."

• Joins American Polymer

Max Potash, who was previously associated with the Chemical Division of the Tennessee Valley Authority, and more recently with Publicker Industries, Inc., has joined the staff of the American Polymer Corporation, Peabody, Mass. At Peabody, he will have charge of Pilot Development involving the transition of research projects into production.

A graduate of the College of the City of New York, Mr. Potash has had considerable experience in the industrial chemical field. He is co-author of the article on "Butadiene" appearing in the "Encyclopedia of Chemical Technology" Vol. II.

• Sample Cutter

H. Hutten of the technical staff of General Dyestuff Corporation has filed patent

application for a device which is intended for use in cutting quickly samples out of running cloth during wet treatment, e.g., dyeing, printing, bleaching, etc., so that it is not necessary to stop operations and any disadvantage caused by interruption of the process is avoided. The device is a shear-like instrument, the lower portion of which consists of a rectangular casing containing a system of toothed combs which work together when the levers of the device are pressed together. While this procedure properly cuts out the sample, it is caught at the same time by a hook, thus being available immediately for drying, scouring, developing, or any necessary aftertreatment.

• Joins A. E. Staley

Dale T. Bush has joined the industrial products sales staff of A. E. Staley Manufacturing Company, Decatur, Illinois, it was announced recently. Mr. Bush will work out of the Chicago sales office.

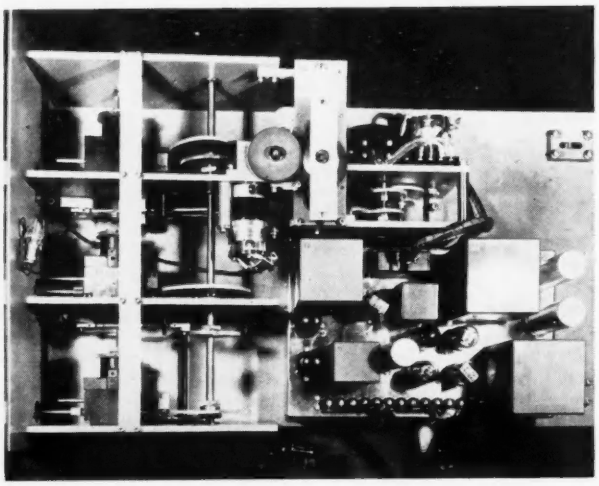
• PTI Alumni Association

The Alumni Association of Philadelphia Textile Institute has scheduled its 48th Annual Outing for Friday, June 3, 1949 at the Manufacturer Country Club, Oreland, Pennsylvania.

• New Color Computing Device

A new color computing device, known as the General Aniline-Librascope Tristimulus Integrator, which figures out the answer to a series of computations involving integral calculus has recently been announced. According to H. R. Davidson, research physicist of General Aniline & Film Corporation, who invented it, and L. W. Imm of Librascope, Inc., Burbank, California, who engineered it, the device which integrates continuously over all portions of the visible spectrum, will tell immediately whether a given color will match another color and, if not, will describe the difference between them. The instrument was designed for use with the General Electric Spectrophotometer invented by Professor Arthur C. Hardy of M.I.T. Only minor modifications of the spectrophotometer are required and the computer may be placed inside the existing case.

The integrator, an electronically controlled ball and disc mechanism which is connected directly to the spectrophotometer, gives the correct result the instant the spectrophotometer has "looked" at the color. Calculations are completed within the 2½ minutes required for measurement of the sample in the spectrophotometer. According to its inventors, the computer calculates the tristimulus values with a precision of about five-hundredths of one per cent.



General Aniline-Librascope Tristimulus Integrator

• Carbide & Carbon Transferral

L. D. Berger, Jr., of Carbide and Carbon Chemicals Corporation has been transferred from Seattle, Washington, where he was district Manager, to the Company's New York office to co-ordinate advertising activities for the Chemicals Sales Department.

• Drimeter Available On Hunter Dryers

The James Hunter Machine Company at North Adams, Mass., has announced that the Fielden Drimeter, a moisture control instrument, is available on their cloth dryers as an optional accessory.

Stating that the decision to recommend and install Fielden instruments on their machines followed careful testing, James H. Hunter, vice-president, said, "Tests show that the Drimeter continuously and instantaneously indicates the moisture content of fabrics within the limits of about a plus or minus 1 per cent. The Fielden control unit will vary the machine speed to maintain the moisture content to these limits automatically. Mills which have the meter in operation tell us that elimination of overdrying has improved quality, reduced costs, and increased production.

"We are the first machinery manufacturer in this country to recommend and fit the Drimeter, although it is interesting to know that seven of eight manufacturers in England have standardized on Fielden instruments, where the device was introduced little more than two years ago."

• Course On Textile Fabrics

William F. Luther, Research Associate of the Industrial Research Institute of the University of Chattanooga and Director of Research for the Dixie Mercerizing Company, is directing a course entitled "Textile Fabrics" in the Evening College of the University of Chattanooga. The course has been designed to acquaint merchandising and manufacturing personnel with the field of textiles in a general way by means of series of lectures given by visiting lecturers expert in their field.

• Brown Instrument Course

An intensive course in the application of measuring and controlling instruments to textile processing will be started on May 31 by Brown Instruments division of Minneapolis-Honeywell Regulator Company. The class will be conducted at the Brown School of Instrumentation at Philadelphia.

The course, one of several added for the benefit of specific industries since Brown training school facilities were increased last year, will be confined to textile manufacturers' and processors' personnel, said M. J. Ladden, chief instructor.

In addition to studies of instrument applications, the course will include maintenance and construction of thermometers, pressure gauges, hygrometers, pneumatic control and transmission, electric control, the textile Moist-o-Graph and the electronic potentiometer.

e stand-
where the
ore than

abrics
Associate
titute of
d Direc-
rcerizing
entitled
College
a. The
aint mer-
ersonnel
general
es given
eir field.

ourse
plication
truments
rted on
division
or Com-
d at the
at Phil-

ded for
es since
were in-
to tex-
rs' per-
instruc-

trument
le main-
ometers,
eumatic
control,
he elec-

21, 1949

dyelines

No. 7 of a series.

PUBLISHED BY *AMERICAN Cyanamid COMPANY* CALCO CHEMICAL DIVISION
Bound Brook, New Jersey
New York • Chicago • Boston • Philadelphia • Charlotte • Providence

HINTS ON CARBONIZATION AND NEUTRALIZATION OF WOOLEN CLOTH

A neutralization or slight acidification of woolen cloth in the washers after scouring, but prior to carbonizing, aids in overcoming unevenness caused by alkali migration. This does not eliminate all other causes of unevenness, however.

In woolen mills operating with this procedure, excellent results are being obtained. The finished cloth has a better "hand" or "feel" and is soft, rather than harsh and raspy as it is if carbonized and neutralized after dyeing.

Since the pre-acidification helps to eliminate resist marks and unevenness, there are fewer re-dyes.

The following procedure has been used with excellent results. After scouring, rinsing, and removal of rinse water, the cloth is treated in a fresh bath containing 3% Acetic Acid (28%) or 1% Formic Acid (80%) at 120° F. for about 20 minutes. This small amount of acid reduces the pH of the cloth from about 9 to a pH of 6.5 to 7. Such slightly acidified pieces, after the excess liquor has been extracted, show a marked improvement in the uniformity with which the carbonizing liquor is absorbed.

If the goods are to be dyed after carbonizing with level dyeing acid dyes or Calcofast* Wool dyes, only rinsing is necessary. On the other hand, if the goods are to be dyed meta or top chrome or if milling dies are to be used in the process, it is necessary to neutralize with soda ash, ammonia, sodium acetate, etc., prior to dyeing.

A Money Saver...

Calcochrome* Alizarine Gray 2BLS is outstanding for its economy of application on wool, as a base for seasonable grays, and as a shading color

for buffs, tans and taupes. Ideal for automotive and upholstery fabrics—it's fast to light and water spotting. It is also good in union, acid or chrome formulations for apparel fabrics.

Calcosol* Navy Blue Paste

Calcosol Navy Blue Paste, a vat dye, produces shades of uniform tone in various depths of shade and heavy shades that retain their clarity without bronzing. Ideal for full, bright shades of vat navies exhibiting excellent fastness properties, especially to light, water-spotting, chlorine, it is also suitable for the usual methods of vat dye application on raw stock, yarn or piece goods.

A full range of navy shades from the red to the green cast can be produced by shading Calcosol Navy Blue Paste with Calcoloid* Blue BLN Double Paste, Calcosol Violet RR Extra Paste or Calcosol Jade Green N Double Paste.

FOR THE TEXTILE BOOKSHELF

The Practical Art Of Color Matching (Calco Technical Bulletin No. 573)—by Wm. H. Peacock, Calco Technical Service Department. This bulletin has been in popular demand since its release several years ago.

A Laboratory Study of Padding. (Calco Technical Bulletin No. 808)—Part I: Cotton: by C. L. Zimmerman and G. L. Royer, Research Department.

One of the first scientific studies published concerning the principles of padding and liquid removal by squeeze rolls; covers some of the factors that control pick-up and preferential sorption of dye or dye solvent.

Interested?

... in a fast gray with excellent fastness and levelness ... that produces level shades even on yarn in skein or package form ... or when shaded with other vat dyes?

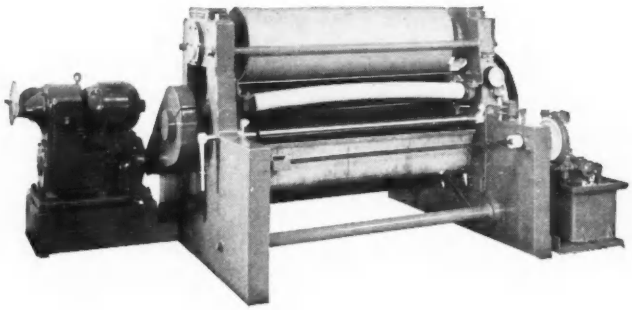
Calco has it! In paste or powder: Calcosol Gray 2G Double Paste, and Calcoloid Gray 2G Double Powder.

*TRADEMARK

Phone operators at Calco handle 5,000 to 8,000 calls daily.

March 2

FOR MODERN *high-speed dyeing*



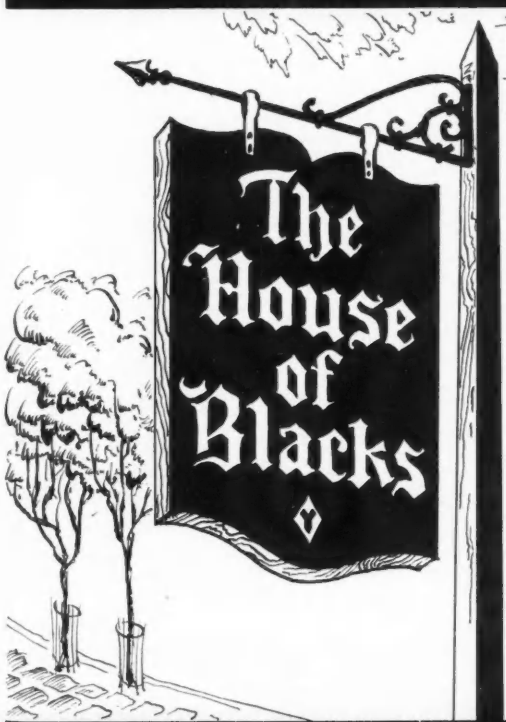
VERDUIN
PADDER

Pressures up to 15 tons acquired by means of Hydraulic system Heavy-duty cast-iron frames embodying quick release on stainless-steel dye bath pan for cleaning. Variable speed drive, speeds to suit your requirements.

Manufacturers of a complete line of textile wet-processing equipment

John VERDUIN MACHINE CORP.
353 10th AVE., PATERSON, N. J.

WHERE QUALITY IS FOREMOST



● **Acid**
Acetate

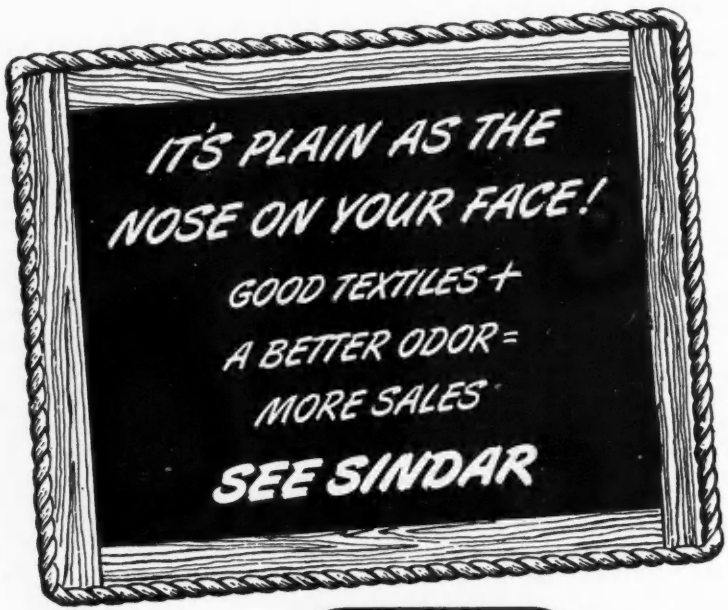
● **Direct**
Formaldehyde

Stocks carried by Dyestuff Distributors in all Textile Centers

YOUNG ANILINE WORKS, Inc.

OFFICE and FACTORY
2731 Boston Street
Baltimore 24, Md.

PATERSON OFFICE
50 East 13th Street
Paterson, N. J.



SINDAR *Corporation*
Industrial Aromatics and Chemicals

330 West 42nd Street • New York 18, N. Y.

Branches: Philadelphia, Boston, Cincinnati, Detroit, Chicago, Seattle, Los Angeles, Montreal, Toronto

HASTINGS LIGHT FAST VIOLET IRS—(C. I. 1073)
and
HASTINGS LIGHT FAST VIOLET 3RL

Excellent Level Dyeing Properties
Very Good Fastness to Light

Recommended for producing fast shades on
Ladies' Dress Goods, Carpet Yarn and Upholstery Materials.

ZINSSER & COMPANY, Inc.
ESTABLISHED 1897
Manufacturing Chemists
HASTINGS-ON-HUDSON NEW YORK

E *is for Efficiency*

E *is for Economy*

E *is for Easy to Use*

YES
E *is for Exsize*

DESIZE with EXSIZE!*

WRITE FOR FREE BOOKLET

PABST BREWERIES

Copr. 1949
Pabst Brewing Company
Milwaukee, Wisconsin

* Trademark Reg., U. S. Pat. Office

PABST
SALES COMPANY
221 N. La Salle Street
CHICAGO 1, ILLINOIS

how do you choose bleach silicate?

HERE'S HOW! You'll take, of course, a clear, bright silicate. But don't stop there; other brands sold for textile processing may look like "Star". There's where the resemblance ends. Star Silicate is the first recommendation of peroxide suppliers as the bleach assistant for these important advantages:

Star is especially purified to remove harmful iron and titanium.

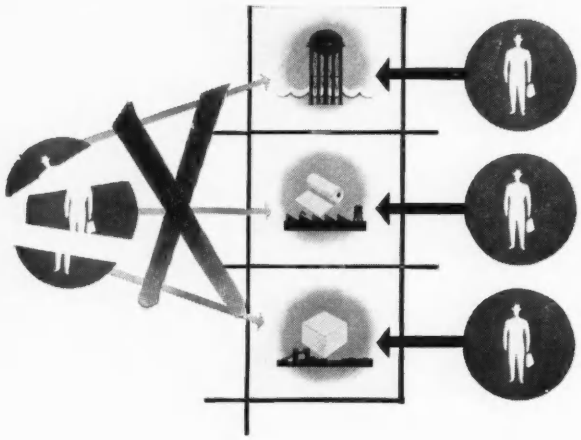
Star is more stable to high dilution and heat, hence efficiently controls oxygen release.

Star's reserve alkalinity keeps bath working longer with no damaging floc.

Choose Star for either batch or continuous system to save peroxide and produce more first quality goods. See PQ now about prices and delivery on Star Silicate for a trial run in your mill.

PHILADELPHIA QUARTZ COMPANY
1135 Public Ledger Building, Philadelphia 6, Pa.

star brand silicate



WHY THIS TECHNICAL SERVICE IS DIFFERENT...

Solvay Technical Service is organized on an "Industry-Wise" system . . . with Technical Service men who have spent their entire careers specializing in individual industries. The result—each man knows his industry and its problems more intimately; he can offer sound advice and practical help.

Our textile specialist is thoroughly familiar with all chemicals utilized in textile manufacturing processes. But though many of the same chemicals are used in the paper, water or other industries, our textile specialist is not called in on their problems . . . because *his* entire experience is concentrated on textile operations. The paper, water and other industries are covered by SOLVAY TECHNICAL SERVICE men who are experts in their respective fields.

When you come across a production-snagging technical situation involving alkalies or associated products in your plants . . . why not call SOLVAY Industry-Wise TECHNICAL SERVICE for help? The strictest confidence is assured. And remember — SOLVAY is backed by *sixty-seven years* of technical experience!

SOLVAY SALES DIVISION
ALLIED CHEMICAL & DYE CORPORATION
40 Rector Street, New York 6, N. Y.

BRANCH SALES OFFICES:
Boston • Charlotte • Chicago • Cincinnati • Cleveland
Detroit • Houston • New Orleans • New York
Philadelphia • Pittsburgh • St. Louis • Syracuse

Industry-Wise
SOLVAY *Technical Service*
Specialists in Specific Industries

QUALITY L.L.R. PERFORMANCE

We EXPORT...

DYESTUFFS

In spite of recent price increases almost throughout the entire industry, we have managed, in many instances, to maintain our old price schedules.

We adhere scrupulously to the standards of quality and service which our many friends abroad have been accustomed to expect from us.

Ever ready for new connections of a constructive character, we solicit specific inquiries from interested consumers.

L. L. RONA & CO., INC.
Established 1929
40 Exchange Place
New York 5, N. Y.
Cable Address
"ELRONA"

FOR IMMEDIATE SALE

5000 POUNDS

ULTRAWET A

•

No reasonable offer refused

Address replies to
BOX No. 605

AMERICAN DYESTUFF REPORTER
ONE MADISON AVENUE
NEW YORK 10, N. Y.

COMMONWEALTH
COLOR & CHEMICAL CO.

More than forty years' experience in the manufacture of Chemical Specialties, Dyestuffs and Dyewoods for the Textile and Allied Trades . . .

MAIN OFFICE AND WORKS:
NEVINS, BUTLER and BALTIC STREETS, BROOKLYN 17, N. Y.
PHILADELPHIA • CHICAGO • GLOVERSVILLE • MONTREAL

BECCO HYDROGEN PEROXIDE

Make full use of
BECCO TECHNICAL CONSULTATION

Becco technical engineers have a wealth of knowledge and practical experience to bring to your bleaching requirements. Becco laboratories have accumulated a large amount of valuable data applicable to your problems.

Let this Becco service assist you in producing higher quality, lower cost, uniform bleaching of all fibres by all methods — including continuous bleaching. Write or call — at no obligation.

BECCO SALES CORPORATION
AGENTS FOR BUFFALO ELECTRO-CHEMICAL COMPANY, INC.
BUFFALO 7, NEW YORK

New York Boston Philadelphia Chicago Charlotte

• CLASSIFIED ADVERTISEMENTS •

The rate for "Position Wanted" advertisements in this column is 2 cents a word—with a minimum of 50 cents per insertion. For all other types of advertisements—i.e., help wanted, machinery wanted or for sale—the rate is $7.50 per column inch or less per insertion.

WANTED: ANALYTICAL CHEMIST — Graduate with major in Analytical Chemistry—supervisory experience desired, to take charge of Control and Technical Service section of Laboratory—large Textile Manufacturer in Metropolitan New York area. Starting salary commensurate with qualifications. Write Box No. 604.

WANTED:

Technical Sales Representative for Southern territory by old established chemical manufacturer. An unusual opportunity for a man having following qualifications: At least five years selling experience, actual textile mill experience preferred but not essential. Must have a knowledge of dyeing and finishing. Territory open Virginia, North and South Carolina. Established business. Car furnished. Only experienced men need apply. Salary commensurate with ability. References required, treated confidential.

Write Box No. 568

FINISHER WANTED: Nationally known textile organization in South wants a qualified finisher who has had experience on flat goods and underwear crepe. Man should have very sound synthetic fabric background. Please write giving full particulars on experience, background and some indication of salary desired. Write Box No. 599.

POSITION WANTED: AS TECHNICAL SALES REPRESENTATIVE IN CHINA. B.S. in chemistry. Trained in the laboratory of one of the biggest dyestuff manufacturers in the United States on dyestuff application and testing. Have good connections with dyeing houses in China. Seeking position in China on salary or commission basis. Write Box No. 606.

WANTED: Salesman for Manufacturer of Textile Detergents and Specialties. Must have proven sales ability with broad contacts. Excellent opportunity for the right man. Write Box No. 608.

POSITION WANTED with warp knit fabrics manufacturer interested in the continued development and quality improvement of his products. Extensive tricot processing and textile chemical background. Nylon, rayon, acetate, and cotton fabrics. Laboratory development work and translation to plant processing conditions. Competent color matcher. Write Box No. 600.

FABRIC DEVELOPMENT ENGINEER

Large, outstanding manufacturer of knit underwear seeks young textile or engineering school graduate to act as Fabric Development Assistant to Director of Research. Experience in knitting or bleaching of knit goods highly desirable. This position involves living in a suburban community in the Northeast, but requires prolonged trips to a mill in the South. The importance of this position will grow with the demonstrated ability of the man selected. Please submit resume outlining background, education, experience, and salary requirements. All resumes will be treated confidentially. Write Box No. 609.

WANTED: Chemist for Textile Lab. Experience in surface active agents and dyeing and finishing desirable. Management ability and experience required. Good educational background essential and some research preferable. Good salary and good future in management capacity of good company. Write Box No. 607.

MANAGER WANTED: Excellent opportunity man experienced buying/selling dyestuffs, chemicals. Domestic and export. Technical knowledge dyes helpful. State qualifications. Write Box No. 610.

FIRST CLASS HOSIERY DYER WANTED FOR PHILADELPHIA AREA. State experience, qualifications and salary expected. Reply to Box No. 611.

N O T I C E

CLASSIFIED ADVERTISEMENTS

ARE RESTRICTED TO

HELP WANTED — POSITIONS WANTED

MACHINERY (wanted or for sale)

OTHER TYPE COPY WILL NOT BE ACCEPTED

American Dyestuff Reporter

AN INVITATION
to the
KNITTING TRADE

The industry's leading manufacturers of knitting, dyeing and drying machinery, mill supplies and allied products, exhibiting their machines, processes and new mechanical features

INVITE YOU TO ATTEND
The 39th
KNITTING ARTS EXHIBITION
April 25 thru 29, 1949

ATLANTIC CITY AUDITORIUM ATLANTIC CITY, N. J.

Under the Auspices
of
NATIONAL ASSOCIATION OF HOSIERY MANUFACTURERS

THE ATLANTIC CITY AUDITORIUM WILL BE TRANSFORMED INTO THE LARGEST KNITTING MILL EVER PUT IN OPERATION

Mill officials, company executives, purchasing agents, sales managers and key men in all branches and departments of the trade should plan to attend and become familiar with the latest and improved methods shown by over three hundred of the industry's leading manufacturers.

PLAN TO ATTEND!

ATLANTIC CITY PROVIDES EXCELLENT HOTEL ACCOMMODATIONS — AT A WIDE RANGE OF RATES — ATTRACTIONS FOR RELAXATION AND ENTERTAINMENT

Tickets may be secured free from exhibitors or from the management
Albert C. Rau, *Manager* **929 Park Square Bldg., Boston, Mass.**

QUALITY RICHMOND PRODUCTS

ROSOFT

A NEW TYPE SOFTENER

USE IT

- On bleaches—does NOT darken up to 300° F.
- On cottons and rayon knit goods.
- Directly in Dyebath.
- Along with resin finishes for Nylon hosiery to prevent sticking to the boards.
- On spun Nylon to impart a good "hand."
- On spun Nylon along with Resins and Dullers to delustre.

SEND US YOUR SOFTENING PROBLEMS

ROSOFT has so many and diverse uses we will be happy to consider how it can be used to help you.

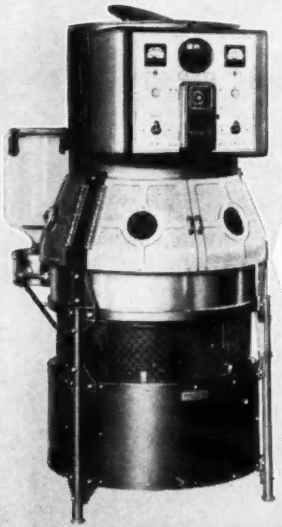
Southern Office
617 Johnston Bldg.
Charlotte, N. C.
Charlotte 2-1428

Send For Samples and Details

RICHMOND OIL, SOAP & CHEMICAL CO., Inc.
1041-43 FRANKFORD AVE., PHILADELPHIA 25, PA.

FADE-OMETER

for accelerated color fading



• Originated and made solely by Atlas. Used all over the world and accepted as the standard color testing machine by the textile industry for over a quarter of a century.

Specimens are rotated around the Atlas Enclosed Violet Carbon Arc—the closest approach to natural sunlight. Temperature automatically controlled. No loss of light intensity of arc during life of machine.

ATLAS ELECTRIC DEVICES CO., 361 W. Superior Street, Chicago, Ill.

ATLAS-OMETERS

WEATHER-OMETER ★ LAUNDER-OMETER ★ FADE-OMETER

INDEX TO ADVERTISERS

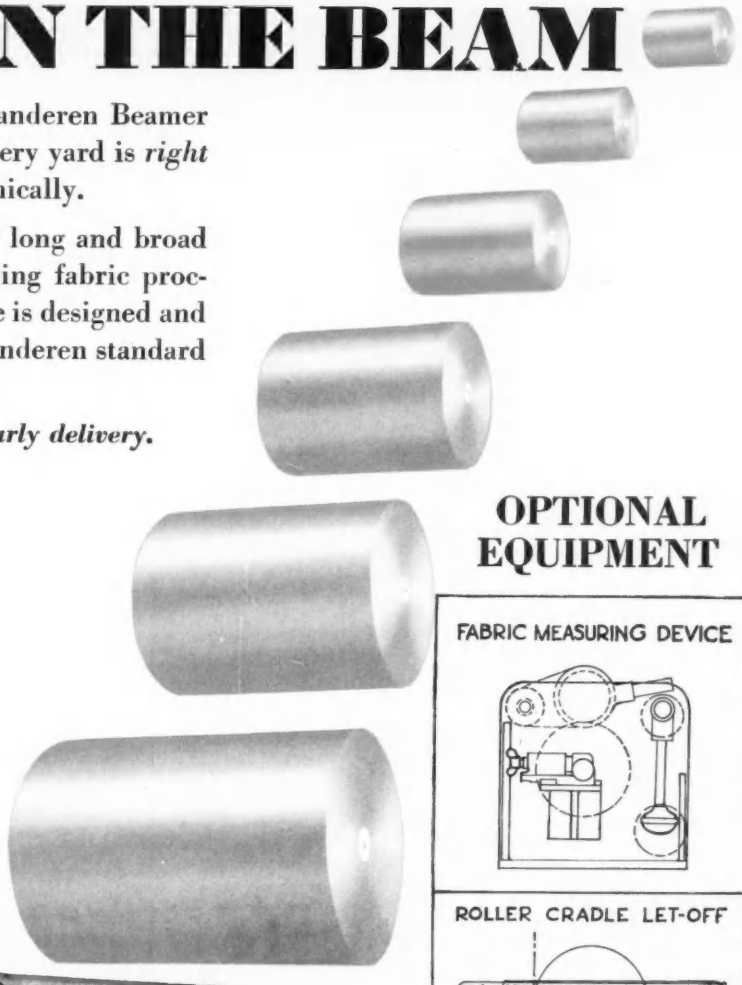
Aktivin Div., The (Heyden Chemical Corp.)	
Alco Oil & Chemical Corp.	
Althouse Chemical Co., Inc.	Second Cover
Amalgamated Chemical Corp.	
American Aniline Products, Inc.	VII
American Cyanamid Co. (Ind. Chem. Div.)	Back Cover
American Dyewood Company	
American Key Products, Inc.	
Anders Chemical Corp.	
Arkansas Company, Inc.	XII
Armour & Co.	VIII
Arnold, Hoffman & Co., Inc.	
Atlantic Chemical Co., Inc.	III
Atlantic Refining Company, The	XVIII
Atlas Electric Devices Co.	XXXIV
Barry Chemical Co.	
Becco Sales Corp.	XXXI
Bick & Co., Inc.	
Blickman, Inc., S.	
Burkart-Schier Chemical Co.	XXXVI
Butterworth Sons Co., H. W.	
Calco Chemical Division, American Cyanamid Co.	XXV
Calgon, Inc.	
Campbell & Co., Inc., John	
Carbic Color & Chemical Co., Inc.	XXII
Carbide & Carbon Chemicals Corp.	
Chem-Col Co., Inc.	
Ciba Company, Inc.	
Colgate-Palmolive-Peet Company	
Commonwealth Color & Chemical Co.	XXXI
Cutting Room Appliances	
Drew & Co., Inc., E. F.	IX
Du Pont de Nemours & Co., Inc., E. I.	
Ammonia Dept.	
Dyestuffs Division	Front Cover
Electrochemicals Dept.	
Fine Chemicals Division	
Emery Industries	
Fancourt & Co., W. F.	XIV
Geigy Company, Inc.	
General Chemical Division, Allied Chemical & Dye Corp.	
General Dyestuff Corp.	XIII
Girdler Corp., The	
Glycerine Producers' Association	XIX
Grinnell Co., Inc.	
Gross & Co., A.	
Gurley, W. & L. E.	
Hardesty Co., W. C.	
Hart Products Corp.	
Hercules Powder Co.	
Heyden Chemical Corp.	
Hinnekens Machine Company	
Hooker Electrochemical Co.	
Houghton & Co., E. F.	
Interchemical Corp., Textile Colors Div.	
International Nickel Co., Inc.	
Kali Mfg. Co.	
Kearny Manufacturing Company	
Kelco Co.	
Koppers Co., Inc.	
Laurel Soap Mfg. Co., Inc.	
Leatex Chemical Co.	
Leeds & Northrup Co.	

RIGHT ON THE BEAM

In plants where this new Van Vlaanderen Beamer is installed you can be sure that every yard is *right* on the beam—quickly and economically.

The logical development from our long and broad experience in designing and building fabric processing machinery, this new machine is designed and manufactured to the high Van Vlaanderen standard for long, trouble-free service.

Your inquiries are invited for early delivery.



SPECIFICATIONS

SIDE FRAMES: Extra rugged construction.

DRIVE: 3 h. p. variable speed motor drive with built-in gear reduction unit. Heavy duty single disk friction clutch for easy starting and stopping.

BEARINGS: Precision type ball bearings throughout.

GUIDE ROLLS: Heavy steel tubing chrome plated and polished.

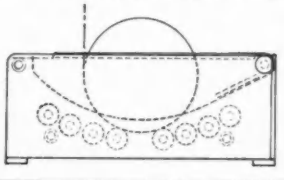
OPTIONAL: Expander as illustrated on machine • Merrow railway sewing machine • Fabric measuring device • Roller cradle let-off

Slat Expander as shown on machine optional equipment.

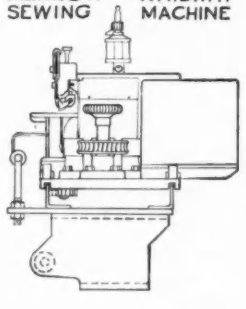
OPTIONAL EQUIPMENT

FABRIC MEASURING DEVICE

ROLLER CRADLE LET-OFF



MERROW SEWING RAILWAY MACHINE



VAN VLAANDEREN MACHINE COMPANY

370 Straight Street • Paterson 3, New Jersey

World's largest manufacturer of machines for processing modern fabrics

Cotton-Textile Institute

Burkart-Schier Chemical Company has pioneered in the development and manufacture of penetrants and finishes for cotton yarns and fabrics. We solicit your inquiries on problems in scouring, bleaching, dyeing and finishing of cotton.

AMERICAN COTTON MADE IN U.S.A.

BURKART-SCHIER CHEMICAL CO.

Manufacturing Chemists for the Textile Industry

CHATTANOOGA, TENNESSEE

PENETRANTS • DETERGENTS • SOFTENERS • REPELLENTS • FINISHES

INDEX TO ADVERTISERS

Mathieson Chemical Corp.	
Maywood Chemical Works	
Metalsmiths Div., Orange Roller Bearing Co., Inc.	
Monsanto Chemical Co.	X, XI
Morrison Machine Company	
National Starch Products	XV
National Aniline Division, Allied Chemical & Dye Corp.	XXIV
National Tube & Reel Corporation	
Nopco Chemical Co.	XVII
Nova Chemical Corp.	
Nyanza Color & Chemical Co.	
Onyx Oil & Chemical Co.	V
Orleans Co., Inc.	
Pabst Sales Company	XXIX
Perkins & Sons, Inc., B. F.	
Pfizer & Co., Inc., Chas.	
Philadelphia Quartz Company	XXIX
Procter & Gamble	VI
Prufcoat Laboratories, Inc.	
Refined Products Corp.	XXI
Richmond Oil Soap & Chemical Co., Inc.	XXXIV
Riggs & Lombard, Inc.	
Rodney Hunt Machine Co.	
Rohm & Haas Company	XXXVIII
Rona & Co., Inc., L. L.	XXX
Royce Chemical Co.	
Rumford Chemical Works	Third Cover
Sandoz Chemical Works, Inc.	
Scholler Bros., Inc.	
Sharples Chemicals Inc.	
Sindar Corp.	XXVIII
Socony-Vacuum Oil Co., Inc.	
Solvay Sales Div., Allied Chemical & Dye Corp.	XXX
Standard Brands, Inc.	XVI
Standard Corrugated Case Co.	
Standard Chemical Products, Inc.	
Stein Hall & Co., Inc.	
Swift & Company	
Synthron, Inc.	
Tennessee Eastman Corp.	
Truitt Mfg. Co.	
Ultra Chemical Works, Inc.	
Union Carbide & Carbon Corp.	
United Chemical Prod. Corp.	
U. S. Stoneware	
Vanderbilt Co., Inc., R. T.	
Van Vlaanderen Machine Co.	XXXV
Verduin Machine Corp., John	XXVII
Virginia Smelting Co.	XXXVII
Wallerstein Co., Inc.	
Warwick Chemical Div., Sun Chemical Corp.	
Watson-Park Company	IV
Winthrop-Stearns Inc.	
Wolf & Co., Jacques	XX
Wyandotte Chemicals Corp.	
Young Co., J. S.	
Young Aniline Works, Inc.	XXVII
Zinsser & Co., Inc.	XXVIII
Zurn Co., O. F.	

X, XI
XV
XXIV
XVII
V
XXIX
XXIX
VI
XXI
XXXIV
XXVIII
XXX
Cover
XXVIII
XXX
XVI
XXXV
XXVII
XXXVII
IV
XX
XXVII
XXVIII
, 1949

teamwork makes the difference

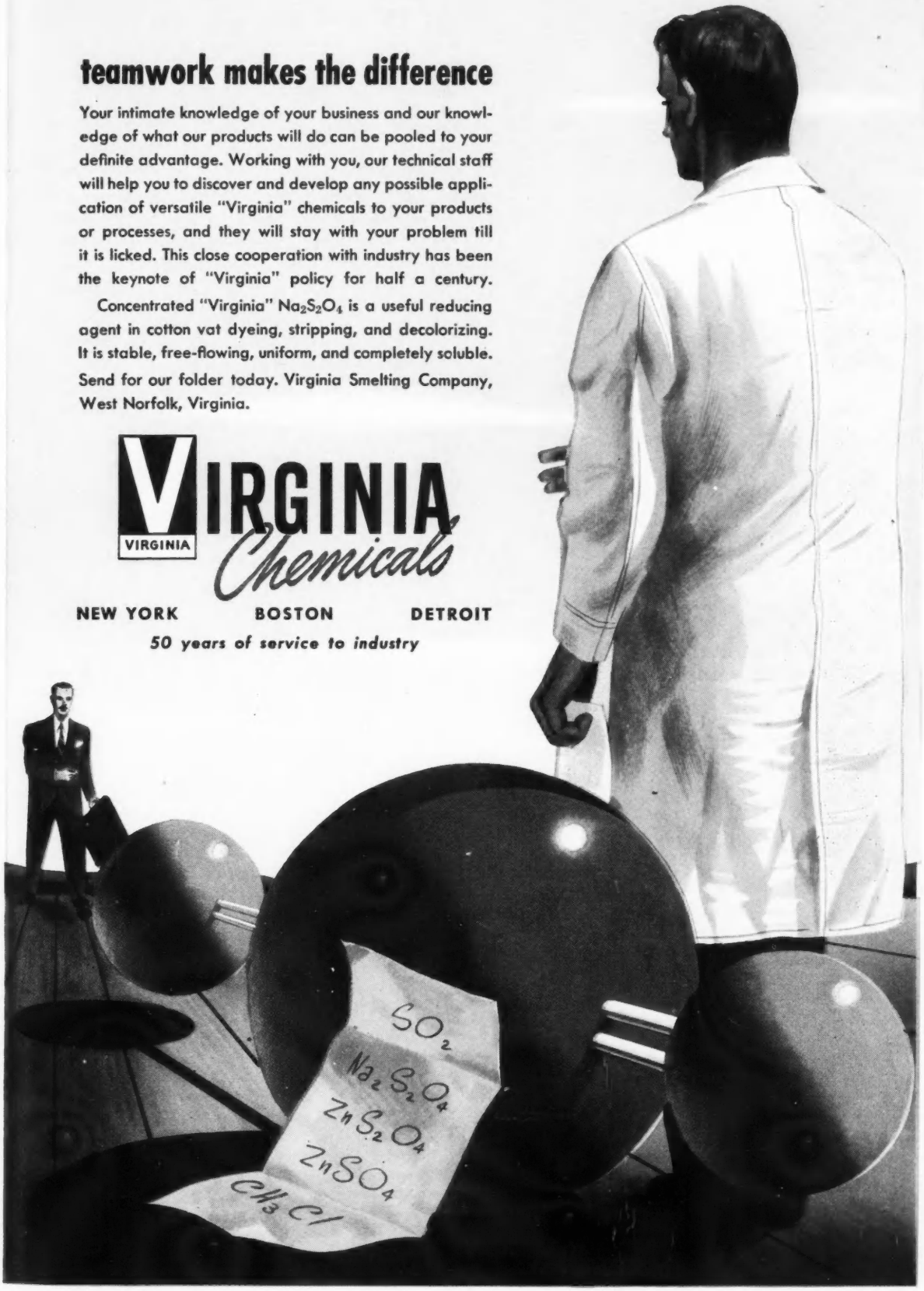
Your intimate knowledge of your business and our knowledge of what our products will do can be pooled to your definite advantage. Working with you, our technical staff will help you to discover and develop any possible application of versatile "Virginia" chemicals to your products or processes, and they will stay with your problem till it is licked. This close cooperation with industry has been the keynote of "Virginia" policy for half a century.

Concentrated "Virginia" $Na_2S_2O_4$ is a useful reducing agent in cotton vat dyeing, stripping, and decolorizing. It is stable, free-flowing, uniform, and completely soluble. Send for our folder today. Virginia Smelting Company, West Norfolk, Virginia.

VIRGINIA Chemicals

NEW YORK BOSTON DETROIT

50 years of service to industry



ENZYME UNCOMMON

. . . New Rohm & Haas Desizing Agent pays extra dividend.

RHOZYME LA gives

✔ STABILITY AT HIGH TEMPERATURE =

✔ MAXIMUM DESIZING SPEED =

and in addition this important extra advantage

✔✔ THE ECONOMY OF A LIQUID ENZYME

Call or write us today for details. RHOZYME is a trade-mark, Reg. U. S. Pat. Off.

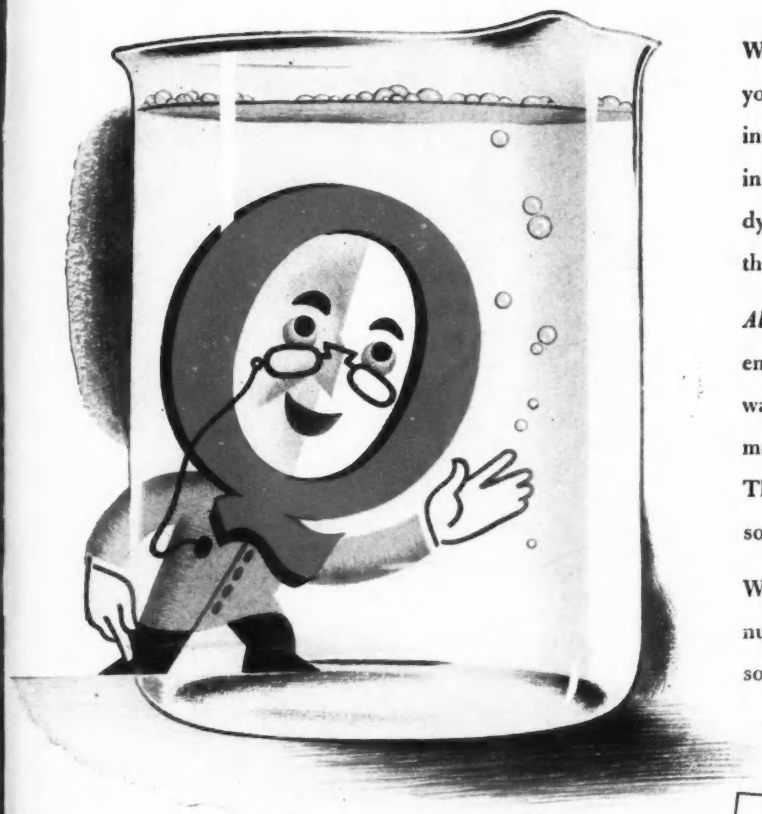
CHEMICALS FOR INDUSTRY

ROHM & HAAS COMPANY

WASHINGTON SQUARE, PHILADELPHIA 5, PA.

Representatives in principal foreign countries

A CLEAR SOLUTION TO YOUR PROCESSING PROBLEMS ... when you use QUADRAFOS*



Which of these processing problems bothers you most? Precipitation of lime soap and other insolubles in hard water? Iron stains on goods in kier boiling? Interference with metal-sensitive dyes? Poor penetration of bleach liquor through redeposited metallic soap?

All these problems disappear when QUADRAFOS enters your process water. That's because no other water conditioner is so effective in tying up all the metallic ions that are at the root of the troubles. The clear solution you get when QUADRAFOS softens the hardest water is the tip-off.

Write for the whole story of the numerous ways QUADRAFOS solves textile processing problems.

softens water without precipitation...deflocculates ...redissolves precipitates...promotes free rinsing

ONLY WITH **QUADRAFOS** CAN WATER DO SO MUCH, SO WELL

*Reg. U. S. Pat. Off.

RUMFORD DIVISION, HEYDEN CHEMICAL CORP.
Technical Service Department
20 Newman Avenue
Rumford 16, Rhode Island

Please send me further information about the use of QUADRAFOS in textile wet processing. I'm particularly interested in:

- ☐ Raw wool scouring
- ☐ Piece goods scouring
- ☐ Kier boiling
- ☐ Reducing bleach requirements
- ☐ Brighter, more uniform dyeing
- ☐ Viscosity control of printing pastes
- ☐ .....

Name .....

Firm .....

Address .....

.....

City ..... *Zone* ..... *State* .....

SPEEDIER APPLICATION in the wetting of textiles is achieved with DECERESOL Wetting Agents. Low surface tension of liquid containing DECERESOL OT is illustrated here by the capillary method. Tube on left contains a 0.01% solution of DECERESOL OT 100%, tube on right plain water.

Win both eye and hand approval with NO-ODOROL* finishing oils

Today the hand is often quicker than the eye in deciding a sale. For women are becoming increasingly finish conscious.

Cyanamid offers a full line of specialties that helps textile manufacturers achieve superior processing results. NO-ODOROL Finishing Oils, as an example, are extremely effective as softening agents for cotton, silk and rayon fabrics, and for hosiery and knitted fabrics. Grades are available for use on the finest fabrics as well as for heavy work clothing fabrics—priced to meet every requirement, with quality always maintained.

NO-ODOROL Finishing Oils are only one of a varied line of Cyanamid sulfonated oils and other textile specialties which include penetrants, softeners, finishes, sizing compounds, DECERESOL* Wetting Agents, PARAMUL* 115 Water Repellent and others. Our technical staff and research facilities are at your service in applying these products to your business.

Write for a copy of our booklet, "Textile Specialties".

*Reg. U. S. Pat. Off.

WATER BORNE STAIN RESISTANCE PLUS water repellency can be imparted in one treatment with Cyanamid's PARAMUL 115, a semi-durable water repellent. Easy and economical to use, it is equally suitable for cotton, rayon, linen and wool.

AMERICAN Cyanamid COMPANY

INDUSTRIAL CHEMICALS DIVISION, DEPT. E3

30 ROCKEFELLER PLAZA, NEW YORK 20, N. Y.